Kerosene (petroleum)

Safety Data Sheet

according to Regulation (EU) 2020/878
Reference number: 814594
Revision date: 17/05/2024 Supersedes version of: 09/09/2016 Version: 3.0

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

1.1. Product identifier

Product form	:	Substance
Trade name	:	Kerosene (petroleum)
Chemical name	:	Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).]
EC Index-No.	:	649-404-00-4
EC-No.	:	232-366-4
CAS-No.	:	8008-20-6
REACH registration No.	:	01-2119485517-27-0006
Other means of identification	:	Kerosene (petroleum); Paraffin Lamp Oil; Regular

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

1.2.1. Relevant identified uses

Use of the substance/mixture	:	Heating oil

1.2.2. Uses advised against

Restrictions on use	:	Uses other than those covered by the exposure scenarios appended to this Safety Data Sheet are not supported.

1.3. Details of the supplier of the safety data sheet

Manufacturer
Irving Oil Whitegate Refinery Limited
Whitegate, Midleton, Co. Cork, Ireland
E-mail: esds@irvingoil.com

1.4. Emergency telephone number

Emergency number	:	+ 353 21 4622 200

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable liquids, Category 3	H226
Skin corrosion/irritation, Category 2	H315
Specific target organ toxicity – Single exposure, Category 3, Narcosis	H336
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment – Chronic Hazard, Category 2	H411

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

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

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08 GHS09

Signal word (CLP) : Danger

Hazard statements (CLP) : 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 (CLP) : P102 - Keep out of reach of children.
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+P331 - IF SWALLOWED: Immediately call a POISON CENTER, a doctor. Do NOT induce vomiting.
P332+P313 - If skin irritation occurs: Get medical advice/attention.

EUH-statements : EUH066 - Repeated exposure may cause skin dryness or cracking.

2.3. Other hazards

Other hazards which do not result in classification : 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 wastewater, and unintentional releases should be made to help determine controls appropriate to local circumstances. Handling this product may result in electrostatic accumulation. Use proper grounding procedures. In use may form flammable/explosive vapour-air mixture.

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Conc.	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Kerosene (petroleum)	CAS-No.: 8008-20-6 EC-No.: 232-366-4 EC Index-No.: 649-404-00-4 REACH-no: 01-2119485517-27-0006	100	Flam. Liq. 3, H226 Skin Irrit. 2, H315 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411

Full text of H- and EUH-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Get medical advice/attention if you feel unwell. If medical advice is needed, have product container or label at hand. Never give anything by mouth to an unconscious person.

First-aid measures after inhalation : Move the affected person away from the contaminated area and into the fresh air. If experiencing respiratory symptoms: Call a poison center or a doctor.

First-aid measures after skin contact : Take off immediately all contaminated clothing. If skin irritation occurs: Get medical advice/attention. Wash skin thoroughly with mild soap and water.

First-aid measures after eye contact : Immediately rinse with water for a prolonged period while holding the eyelids wide open. When in doubt or if symptoms are observed, get medical advice.

First-aid measures after ingestion : If swallowed, seek medical advice immediately and show this container or label. Immediately call a POISON CENTER/doctor. Do not induce vomiting/risk of damage to lungs exceeds poisoning risk.

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

Symptoms/effects after inhalation : May cause drowsiness or dizziness. Moderate narcotic effect, headaches, nausea.

Symptoms/effects after skin contact : Causes skin irritation. Absorbed through the skin. Repeated exposure may cause skin dryness or cracking.

Symptoms/effects after eye contact : Blurred vision. Lacrimation. Itching.

Symptoms/effects after ingestion : May be fatal if swallowed and enters airways. Aspiration of the product into the lungs may cause very serious pneumonia. May cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

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

Treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Dry powder. Foam. Carbon dioxide.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour. Vapour could form explosive mixture with air. Vapours are heavier than air and may travel considerable distance to an ignition source and flash back to source of vapours. Heating will cause a rise in pressure with a risk of bursting. May form an explosive mixture in the presence of air.

Hazardous decomposition products in case of fire : Carbon dioxide. Carbon monoxide. Nitrogen oxides. Sulphur oxides.

5.3. Advice for firefighters

Firefighting instructions : Do not enter fire area without proper protective equipment, including respiratory protection. Do not fight fire when fire reaches explosives. Use water spray or fog for cooling exposed containers. Do not allow run-off from fire-fighting to enter drains or water courses.

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Wear fire/flame resistant/retardant clothing. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene. Evacuate area. Ventilate spillage area. No open flames, no sparks, and no smoking. Avoid breathing vapours, mist. Do not get in eyes, on skin, or on clothing.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. Use personal protective equipment as required. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Do not allow to enter drains or water courses. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up	:	Stop leak if safe to do so. Contain the spilled material by bunding. Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite. Do not absorb with saw-dust or any other combustible absorbent material. For large spills, confine the spill in a dike and charge it with wet sand or earth for subsequent safe disposal.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Use only outdoors or in a well-ventilated area. Avoid breathing vapours, mist. Avoid contact with skin and eyes.
Hygiene measures	:	Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Handle in accordance with good industrial hygiene and safety procedures. Keep away from food, drink and animal feedingstuffs.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Ground/bond container and receiving equipment.
Storage conditions	:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Store in a well-ventilated place. Keep container tightly closed. Refer to the detailed list of incompatible materials in section 10 Stability/Reactivity.
Packaging materials	:	Keep only in original container.

7.3. Specific end use(s)

Refer to supplemental exposure scenarios if attached.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
Ireland - Occupational Exposure Limits	
Local name	Diesel fuel/kerosene
OEL TWA	100 mg/m³
Regulatory reference	Chemical Agents Code of Practice 2024

8.1.2. Recommended monitoring procedures

Monitoring methods	
Monitoring methods	Refer to all applicable national, international and local regulations or provisions. Workplace atmospheres. Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy. Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. Workplace exposure - General requirements for the performance of procedures for the measurement of chemical agents.

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
DNEL/DMEL (General population)	
Acute - systemic effects, oral	18.8 mg/kg bodyweight

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Organisational measures to prevent/limit releases, dispersion and exposure. The health hazard risks arising from handling this material are affected by different factors, such as physical form and quantity. Site-specific risk assessments are recommended to determine the appropriate levels of exposure control measures.

8.2.2. Personal protection equipment

Personal protective equipment:
Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the protective equipment. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

8.2.2.1. Eye and face protection

Eye protection:
Safety glasses. EN 166:2001 to be superseded by EN ISO 16321-1:2022 on 1-Nov-24. Do not wear contact lenses

8.2.2.2. Skin protection

Hand protection:
Chemical resistant gloves (according to European standard ISO 374-1 or equivalent). Nitrile rubber. Selection of protective gloves should be made based on the type of task performed. The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves. Carefully check the glove for cracks or damage before reusing it, dispose of gloves where the penetration time is exceeded. The penetration time depends on temperature, glove material, thickness and construction.Penetration time is measured against EN 374 in laboratory conditions corresponding to permanent static contact and is not necessarily representative of the risk in the workplace. Contact the gloves' supplier for further information on the selection and resistance of gloves.

Other skin protection

Materials for protective clothing:
Wear chemically protective gloves, lab coat or apron to prevent prolonged or repeated skin contact. Wear foot protection

8.2.2.3. Respiratory protection

Respiratory protection:
In case of insufficient ventilation, wear suitable respiratory equipment. Extra personal protection: A/P2 filter respirator for organic vapour and harmful dust

8.2.2.4. Thermal hazards

Thermal hazard protection:
Not required for normal conditions of use.

8.2.3. Environmental exposure controls

Environmental exposure controls:
Avoid release to the environment. Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Colour	:	Not available
Appearance	:	According to product specification.
Odour	:	Mild paraffinic.
Odour threshold	:	Not available
Melting point	:	Not available
Freezing point	:	Not available
Boiling point	:	150 – 290 °C
Flammability	:	Not applicable
Lower explosion limit	:	0.5
Upper explosion limit	:	6
Flash point	:	> 38 °C
Auto-ignition temperature	:	250 °C
Decomposition temperature	:	Not available
pH	:	Not available
Viscosity, kinematic	:	1 – 2 mm²/s (20 °C)
Solubility	:	Solubility in water. Negligible.
Partition coefficient n-octanol/water (Log Kow)	:	Not available
Vapour pressure	:	3 kPa (20 °C)
Vapour pressure at 50°C	:	Not available
Density	:	Not available
Relative density	:	0.77 – 0.82 (15 °C)
Relative vapour density at 20°C	:	> 1
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

Pour Point	:	> - 25 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapour. Can form explosive mixtures with air.

10.2. Chemical stability

Stable under normal conditions of use.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use. Hazardous polymerisation: Will not occur.

10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. Strong reducing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

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

Acute toxicity (oral) : Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal) : Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation) : Not classified (Based on available data, the classification criteria are not met)

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 Inhalation - Rat	> 5.3 mg/l (mist)

Skin corrosion/irritation : Causes skin irritation.
Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met)
Respiratory or skin sensitisation : Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity : Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity : Not classified (Based on available data, the classification criteria are not met)
Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met)
Additional information : Not expected to cause reproductive toxicity. Hydrodesulphurized kerosine applied to the skin of female rats at 494, 330, or 165 mg/kg daily for 7 consecutive weeks (premating, mating, and gestation), or for 8 consecutive weeks in males did not result in systemic, reproductive, or developmental toxicity.
STOT-single exposure : May cause drowsiness or dizziness.
STOT-repeated exposure : Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard : May be fatal if swallowed and enters airways.

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
Viscosity, kinematic	1 – 2 mm²/s (20 °C)

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

11.2.2. Other information

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	:	Do not allow product to spread into the environment.
Hazardous to the aquatic environment, short–term (acute)	:	Not classified (Based on available data, the classification criteria are not met)
Hazardous to the aquatic environment, long–term (chronic)	:	Toxic to aquatic life with long lasting effects.
Additional information	:	Acute aquatic toxicity studies on samples of jet fuel and kerosine streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. Kerosines should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment.

12.2. Persistence and degradability

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
Persistence and degradability	The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

12.3. Bioaccumulative potential

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
Bioaccumulative potential	Hydrocarbon constituents of kerosine show measured or predicted Log Kow values ranging from 3 to 6 and above and therefore would be regarded as having the potential to bioaccumulate. In practise, metabolic processes may reduce bioconcentration.

12.4. Mobility in soil

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)	
Ecology - soil	On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilisation to air. It is possible that some of the higher molecular weight hydrocarbons will be adsorbed on sediment. Biodegradation in water is a minor loss process. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 0.1 to 0.7 days.

12.5. Results of PBT and vPvB assessment

Kerosine (petroleum); Straight run kerosine; [A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C16 and boiling in the range of approximately 150°C to 290°C (320°F to 554°F).] (8008-20-6)
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties	:	The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Product/Packaging disposal recommendations : Refer to manufacturer/supplier for information on recovery/recycling. Disposal must be done according to official regulations.

Additional information : Do not re-use empty containers. Handle empty containers with care because residual vapours are flammable. Do not burn, or use a cutting torch on the empty drum. Do not puncture or incinerate, even when empty.

European List of Waste (LoW, EC 2000/532) : For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities
13 07 03* - other fuels (including mixtures)

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

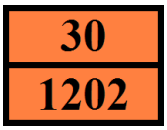
ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 1202	UN 1202	UN 1202	UN 1202	UN 1202
14.2. UN proper shipping name				
HEATING OIL, LIGHT	HEATING OIL, LIGHT	Heating oil, light	HEATING OIL, LIGHT	HEATING OIL, LIGHT
Transport document description				
UN 1202 HEATING OIL, LIGHT, 3, III, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 1202 HEATING OIL, LIGHT, 3, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 1202 Heating oil, light, 3, III, ENVIRONMENTALLY HAZARDOUS	UN 1202 HEATING OIL, LIGHT, 3, III, ENVIRONMENTALLY HAZARDOUS	UN 1202 HEATING OIL, LIGHT, 3, III, ENVIRONMENTALLY HAZARDOUS
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
III	III	III	III	III
14.5. Environmental hazards				
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : F1

Special provisions (ADR) : 640K, 664

Limited quantities (ADR)	:	5l
Excepted quantities (ADR)	:	E1
Packing instructions (ADR)	:	P001, IBC03, LP01, R001
Mixed packing provisions (ADR)	:	MP19
Portable tank and bulk container instructions (ADR)	:	T2
Portable tank and bulk container special provisions (ADR)	:	TP1
Tank code (ADR)	:	LGBF
Vehicle for tank carriage	:	FL
Transport category (ADR)	:	3
Special provisions for carriage - Packages (ADR)	:	V12
Special provisions for carriage - Operation (ADR)	:	S2
Hazard identification number (Kemler No.)	:	30
Orange plates	:	
Tunnel restriction code (ADR)	:	D/E

Transport by sea

Special provisions (IMDG)	:	363
Limited quantities (IMDG)	:	5 L
Excepted quantities (IMDG)	:	E1
Packing instructions (IMDG)	:	P001, LP01
IBC packing instructions (IMDG)	:	IBC03
Tank instructions (IMDG)	:	T2
Tank special provisions (IMDG)	:	TP1
EmS-No. (Fire)	:	F-E
EmS-No. (Spillage)	:	S-E
Stowage category (IMDG)	:	A
Properties and observations (IMDG)	:	Immiscible with water.

Air transport

PCA Excepted quantities (IATA)	:	E1
PCA Limited quantities (IATA)	:	Y344
PCA limited quantity max net quantity (IATA)	:	10L
PCA packing instructions (IATA)	:	355
PCA max net quantity (IATA)	:	60L
CAO packing instructions (IATA)	:	366
CAO max net quantity (IATA)	:	220L
Special provisions (IATA)	:	A3
ERG code (IATA)	:	3L

Inland waterway transport

Classification code (ADN)	:	F1
Special provisions (ADN)	:	640K
Limited quantities (ADN)	:	5 L
Excepted quantities (ADN)	:	E1
Carriage permitted (ADN)	:	T
Equipment required (ADN)	:	PP, EX, A
Ventilation (ADN)	:	VE01
Number of blue cones/lights (ADN)	:	0

Rail transport

Classification code (RID)	:	F1
Special provisions (RID)	:	640K
Limited quantities (RID)	:	5L
Excepted quantities (RID)	:	E1
Packing instructions (RID)	:	P001, IBC03, LP01, R001
Mixed packing provisions (RID)	:	MP19
Portable tank and bulk container instructions (RID)	:	T2

Portable tank and bulk container special provisions (RID)	:	TP1
Tank codes for RID tanks (RID)	:	LGBF
Transport category (RID)	:	3
Special provisions for carriage – Packages (RID)	:	W12
Colis express (express parcels) (RID)	:	CE4
Hazard identification number (RID)	:	30

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 1005/2009)

Dual-Use Regulation (428/2009)

Not listed on the COUNCIL REGULATION (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items.

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

A chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:
Sections 1-16.

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road

Abbreviations and acronyms:	
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties
TWA	Time Weighted Average (8 hours)
STEL	Short Term Exposure Limit (15 minutes)

Data sources : ECHA (European Chemicals Agency). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 and all its amendments and modifications. Supplier's safety documents.

Training advice : Training staff on good practice. Manipulations are to be done only by qualified and authorised persons.

Full text of H- and EUH-statements:	
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Asp. Tox. 1	Aspiration hazard, Category 1
EUH066	Repeated exposure may cause skin dryness or cracking.
Flam. Liq. 3	Flammable liquids, Category 3
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.
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Narcosis

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Annex to the safety data sheet

1. ES-1 - Manufacture; Manufacture of substance

1.1. Title section

Manufacture of substance	
ES Ref.: ES-1 ES Type: Environment - Worker	

Environment		Use descriptors
CS-1.1	Manufacture of substance	ERC1, ERC4, ESVOC SPERC 1.1.v1

Worker		Use descriptors
CS-1.2	Manufacture of substance	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

Processes, tasks, activities covered	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of substance (ERC1, ERC4, ESVOC SPERC 1.1.v1)

ERC1	Manufacture of the substance
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 1.1.v1	Manufacture of substances: Industrial (SU8, SU9)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	5400000 t/yr
Fraction of Regional tonnage used locally:	0.11
Continuous release	
Emission days	300 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater sediment. Onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater	
Treat air emission to provide a typical removal efficiency of	90 %

Technical and organisational conditions and measures	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 97.7 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 56.1 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	97.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	2000000 kg/d
Assumed domestic sewage treatment plant flow	10000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
During manufacturing no waste of the substance is generated	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.01	
Release fraction to wastewater from process (initial release prior to RMM):	0.0003	
Release fraction to soil from process (initial release prior to RMM):	0.0001	

1.2.2. Control of worker exposure: Manufacture of substance (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15)

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

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100

Product (article) characteristics	
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature)	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (closed systems)	No other specific measures identified
General exposures (open systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Process sampling	No other specific measures identified
Laboratory activities	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Bulk product storage	No other specific measures identified

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure Manufacture of substance (ERC1, ERC4, ESVOC SPERC 1.1.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

1.3.2. Worker exposure Manufacture of substance (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

1.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

1.4.2. Health

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

2. ES-2 - Industrial; Use of substance as an intermediate

2.1. Title section

Use of substance as an intermediate	
ES Ref.: ES-2 ES Type: Environment - Worker	

Environment		Use descriptors
CS-2.2	Use as an intermediate	ERC6a, ESVOC SPERC 6.1a.v1

Worker		Use descriptors
CS-2.1	Use as an intermediate	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15

Processes, tasks, activities covered	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use as an intermediate (ERC6a, ESVOC SPERC 6.1a.v1)

ERC6a	Use of intermediate
ESVOC SPERC 6.1a.v1	Manufacture of substances: Industrial (SU8, SU9)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	180000 t/yr
Fraction of Regional tonnage used locally:	0.083
Continuous release	
Emission days	300 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater sediment. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater	
Treat air emission to provide a typical removal efficiency of	80 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 81.4 %

Technical and organisational conditions and measures	
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	180000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
This substance is consumed during use and no waste of the substance is generated	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.001	
Release fraction to wastewater from process (initial release prior to RMM):	0.0003	
Release fraction to soil from process (initial release prior to RMM):	0.0001	

2.2.2. Control of worker exposure: Use as an intermediate (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Vapour pressure < 0.5 kPa at STP
	< 0.1 kPa

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature)	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (open systems)	No other specific measures identified
General exposures (closed systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Process sampling	No other specific measures identified
Laboratory activities	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Bulk product storage	No other specific measures identified

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure Use as an intermediate (ERC6a, ESVOC SPERC 6.1a.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

2.3.2. Worker exposure Use as an intermediate (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

2.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

2.4.2. Health

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

3. ES-3 - Industrial; Distribution of substance

3.1. Title section

Distribution of substance	
ES Ref.: ES-3 ES Type: Environment - Worker	

Environment		Use descriptors
CS-3.1	Distribution of substance	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1

Worker		Use descriptors
CS-3.2	Distribution of substance	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15

Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Distribution of substance (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1)

ERC1	Manufacture of the substance
ERC2	Formulation into mixture
ERC3	Formulation into solid matrix
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6a	Use of intermediate
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC6c	Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC6d	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)
ERC7	Use of functional fluid at industrial site
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	5400000 t/yr
Fraction of Regional tonnage used locally:	0.002
Continuous release	
Emission days	300 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. No wastewater treatment required	
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	≥ 0 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	2600000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.001	
Release fraction to wastewater from process (initial release prior to RMM):	0.00001	
Release fraction to soil from process (initial release prior to RMM):	0.00001	

3.2.2. Control of worker exposure: Distribution of substance (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (closed systems)	No other specific measures identified
General exposures (open systems)	No other specific measures identified
Process sampling	No other specific measures identified
Laboratory activities	No other specific measures identified
Bulk transfers	No other specific measures identified
Drum and small package filling	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Bulk product storage	No other specific measures identified

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure Distribution of substance (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

3.3.2. Worker exposure Distribution of substance (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15)

Information for contributing exposure scenario
Gas Oils (Straight-run) exhibits acute inhalation toxicity and is classified H332 (Harmful by inhalation) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary / additional RMMs. Gas Oils (Straight-run) is classified H304 (Harmful: may cause lung damage if swallowed). The available data for this adverse effect do not provide quantitative dose-response information for a D(M)NEL to be derived. Instead, the toxicity data triggers a qualitative risk characterisation and the RMMs in section 2 of the SDS aims to define the appropriate RMMs necessary to protect from this adverse effect. Gas Oils (Straight-run) is classified EUH066 (Repeated exposure may cause skin dryness or cracking). The available data for this adverse effect do not provide quantitative dose-response information for a D(M)NEL to be derived. Instead, the toxicity data triggers a qualitative risk characterisation and the RMMs in section 2 of the SDS aims to define the appropriate RMMs necessary to protect from this adverse effect. Available hazard data does not support the need for a DNEL to be established for other health effects,Available hazard data does not support the need for a DNEL to be established for other health effects

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

3.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

3.4.2. Health

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

4. ES-4 - Industrial, Formulation; Formulation & (Re)packing of substances and mixtures

4.1. Title section

Formulation & (Re)packing of substances and mixtures	
ES Ref.: ES-4 ES Type: Environment - Worker	

Environment		Use descriptors
CS-4.1	Formulation & (Re)packing of substances and mixtures	ERC2, ESVOC SPERC 2.2.v1

Worker		Use descriptors
CS-4.2	Formulation & (Re)packing of substances and mixtures	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15

Processes, tasks, activities covered	Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Formulation & (Re)packing of substances and mixtures (ERC2, ESVOC SPERC 2.2.v1)

ERC2	Formulation into mixture
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	5200000 t/yr
Fraction of Regional tonnage used locally:	0.0058
Continuous release	
Emission days	300 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater sediment. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater	
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	≥ 86 %

Technical and organisational conditions and measures	
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	260000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.01	
Release fraction to wastewater from process (initial release prior to RMM):	0.0002	
Release fraction to soil from process (initial release prior to RMM):	0.0001	

4.2.2. Control of worker exposure: Formulation & (Re)packing of substances and mixtures (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (closed systems)	No other specific measures identified
General exposures (open systems)	No other specific measures identified
Process sampling	No other specific measures identified
Laboratory activities	No other specific measures identified
Bulk transfers	No other specific measures identified
Mixing operations (open systems)	No other specific measures identified
Manual Transfer from/pouring from containers	No other specific measures identified
Drum/batch transfers	No other specific measures identified
Production or preparations or articles by tabletting, compression, extrusion or pelletisation	No other specific measures identified
Drum and small package filling	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Bulk product storage	No other specific measures identified

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure Formulation & (Re)packing of substances and mixtures (ERC2, ESVOC SPERC 2.2.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

4.3.2. Worker exposure Formulation & (Re)packing of substances and mixtures (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

4.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

4.4.2. Health

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

5. ES-5 - Industrial; Use of substance in Metal working fluids / rolling oils - Industrial

5.1. Title section

Use of substance in Metal working fluids / rolling oils - Industrial	
ES Ref.: ES-5 ES Type: Environment - Worker	

Environment		Use descriptors
CS-5.1	Use of substance in Metal working fluids / rolling oils - Industrial	ERC4, ESVOC SPERC 4.7a.v1

Worker		Use descriptors
CS-5.2	Use of substance in Metal working fluids / rolling oils - Industrial	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17

Processes, tasks, activities covered	Covers the use in formulated MWFs/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Use of substance in Metal working fluids / rolling oils - Industrial (ERC4, ESVOC SPERC 4.7a.v1)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 4.7a.v1	Metal working fluids and rolling oilds: Industrial (SU3)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	550 t/yr
Fraction of Regional tonnage used locally:	0.18
Continuous release	
Emission days	20 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required. Prevent discharge of undissolved substance to or recover from onsite wastewater	
Treat air emission to provide a typical removal efficiency of	70 %

Technical and organisational conditions and measures	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 0 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	490000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.02	
Release fraction to wastewater from process (initial release prior to RMM):	0.00003	
Release fraction to soil from process (initial release prior to RMM):	0	

5.2.2. Control of worker exposure: Use of substance in Metal working fluids / rolling oils - Industrial (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing

PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions in metal working operations

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
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. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying
Automated metal rolling/forming	No other specific measures identified
Semi-automated metal rolling/forming	No other specific measures identified
Equipment cleaning and maintenance,Dedicated facility	No other specific measures identified
Equipment cleaning and maintenance,Non-dedicated facility	No other specific measures identified
Storage	No other specific measures identified
General exposures (open systems)	No other specific measures identified
General exposures (closed systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Filling of equipment from drums or containers	No other specific measures identified
Process sampling	No other specific measures identified
Metal machining operations	No other specific measures identified
Treatment by dipping and pouring	No other specific measures identified
Spraying	No other specific measures identified
Manual Roller, spreader, flow application	No other specific measures identified

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure Use of substance in Metal working fluids / rolling oils - Industrial (ERC4, ESVOC SPERC 4.7a.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

5.3.2. Worker exposure Use of substance in Metal working fluids / rolling oils - Industrial (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

5.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

5.4.2. Health

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

6. ES-6 - Professional; Use of substance in Metal working fluids / rolling oils - Professional

6.1. Title section

Use of substance in Metal working fluids / rolling oils - Professional	
ES Ref.: ES-6 ES Type: Environment - Worker	

Environment		Use descriptors
CS-6.1	Use of substance in Metal working fluids / rolling oils - Industrial	ERC8a, ERC8d, ESVOC SPERC 8.7c.v1

Worker		Use descriptors
CS-6.2	Use of substance in Metal working fluids / rolling oils - Professional	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17

Processes, tasks, activities covered	Covers the use in formulated MWFs including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/ reject articles, and disposal of waste oils

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Use of substance in Metal working fluids / rolling oils - Industrial (ERC8a, ERC8d, ESVOC SPERC 8.7c.v1)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ESVOC SPERC 8.7c.v1	Metal working fluids and rolling oilds: Professional (SU22) - high environmental release

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	550 t/yr
Fraction of Regional tonnage used locally:	0.0005
Continuous release	
Emission days	365 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. No wastewater treatment required	

Technical and organisational conditions and measures	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 0 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	90 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.15	
Release fraction to wastewater from process (initial release prior to RMM):	0.05	
Release fraction to soil from process (initial release prior to RMM):	0.05	

6.2.2. Control of worker exposure: Use of substance in Metal working fluids / rolling oils - Professional (PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing

PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC17	Lubrication at high energy conditions in metal working operations

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
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. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying
General exposures (closed systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Filling of equipment from drums or containers,Dedicated facility	No other specific measures identified
Filling of equipment from drums or containers,Non-dedicated facility	No other specific measures identified
Process sampling	No other specific measures identified
Metal machining operations	No other specific measures identified
Automated metal rolling/forming	No other specific measures identified
Manual Roller, spreader, flow application	No other specific measures identified
Spraying	No other specific measures identified
Equipment cleaning and maintenance,Dedicated facility	No other specific measures identified
Equipment cleaning and maintenance,Non-dedicated facility	No other specific measures identified
Treatment by dipping and pouring	No other specific measures identified
Storage	No other specific measures identified

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure Use of substance in Metal working fluids / rolling oils - Industrial (ERC8a, ERC8d, ESVOC SPERC 8.7c.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

6.3.2. Worker exposure Use of substance in Metal working fluids / rolling oils - Professional (PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

6.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

6.4.2. Health

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

7. ES-7 - Industrial; Use of substance as Release agents or binders - Industrial

7.1. Title section

Use of substance as Release agents or binders - Industrial	
ES Ref.: ES-7 ES Type: Environment - Worker	

Environment		Use descriptors
CS-7.1	Use of substance as Release agents or binders - Industrial	ERC4, ESVOC SPERC 4.10a.v1

Worker		Use descriptors
CS-7.2	Use of substance as Release agents or binders - Industrial	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14

Processes, tasks, activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Use of substance as Release agents or binders - Industrial (ERC4, ESVOC SPERC 4.10a.v1)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 4.10a.v1	Use as binders and release agents: Industrial (SU3)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	800 t/yr
Fraction of Regional tonnage used locally:	1
Continuous release	
Emission days	20 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. No wastewater treatment required	
Treat air emission to provide a typical removal efficiency of	80 %
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 0 %

Technical and organisational conditions and measures	
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	4100000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	1	
Release fraction to wastewater from process (initial release prior to RMM):	0.000003	
Release fraction to soil from process (initial release prior to RMM):	0	

7.2.2. Control of worker exposure: Use of substance as Release agents or binders - Industrial (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC6	Calendering operations
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
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. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying
Bulk transfers	No other specific measures identified
Drum/batch transfers	No other specific measures identified
Mixing operations (closed systems)	No other specific measures identified
Mixing operations (open systems)	No other specific measures identified
Mould forming	No other specific measures identified
Casting operations	No other specific measures identified
Machine spraying	No other specific measures identified
manual spraying	No other specific measures identified
Manual Rolling, Brushing	No other specific measures identified
Dipping, immersion and pouring	No other specific measures identified
Bulk product storage	No other specific measures identified

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure Use of substance as Release agents or binders - Industrial (ERC4, ESVOC SPERC 4.10a.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

7.3.2. Worker exposure Use of substance as Release agents or binders - Industrial (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

7.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

7.4.2. Health

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

8. ES-8 - Professional; Use of substance as Release agents or binders - Professional

8.1. Title section

Use of substance as Release agents or binders - Professional	
ES Ref.: ES-8 ES Type: Environment - Worker	

Environment		Use descriptors
CS-8.1	Use of substance as Release agents or binders - Professional	ERC8a, ERC8d, ESVOC SPERC 8.10b.v1

Worker		Use descriptors
CS-8.2	Use of substance as Release agents or binders - Professional	PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14

Processes, tasks, activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Use of substance as Release agents or binders - Professional (ERC8a, ERC8d, ESVOC SPERC 8.10b.v1)

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ESVOC SPERC 8.10b.v1	Use as binders and release agents: Professional (SU22)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	800 t/yr
Fraction of Regional tonnage used locally:	0.0005
Continuous release	
Emission days	365 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. No wastewater treatment required	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 0 %

Technical and organisational conditions and measures	
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	130 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
External treatment and disposal of waste should comply with applicable local and/or national regulations	
External recovery and recycling of waste should comply with applicable local and/or national regulations	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.95	
Release fraction to wastewater from process (initial release prior to RMM):	0.025	
Release fraction to soil from process (initial release prior to RMM):	0.025	

8.2.2. Control of worker exposure: Use of substance as Release agents or binders - Professional (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC6	Calendering operations
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
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. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying
Bulk transfers	No other specific measures identified
Drum/batch transfers	No other specific measures identified
Mixing operations (open systems)	No other specific measures identified
Mixing operations (closed systems)	No other specific measures identified
Mould forming	No other specific measures identified
Casting operations	No other specific measures identified
Machine spraying	No other specific measures identified
manual spraying	No other specific measures identified
Rolling, Brushing	No other specific measures identified
Dipping, immersion and pouring	No other specific measures identified
Bulk product storage	No other specific measures identified

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure Use of substance as Release agents or binders - Professional (ERC8a, ERC8d, ESVOC SPERC 8.10b.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

8.3.2. Worker exposure Use of substance as Release agents or binders - Professional (PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC10, PROC11, PROC14)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

8.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

8.4.2. Health

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

9. ES-9 - Industrial; Use of substance as a Fuel - Industrial

9.1. Title section

Use of substance as a Fuel - Industrial	
ES Ref.: ES-9 ES Type: Environment - Worker	

Environment		Use descriptors
CS-9.1	Use of substance as a Fuel - Industrial	ERC7, ESVOC SPERC 7.12a.v1

Worker		Use descriptors
CS-9.2	Use of substance as a Fuel - Industrial	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16

Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Use of substance as a Fuel - Industrial (ERC7, ESVOC SPERC 7.12a.v1)

ERC7	Use of functional fluid at industrial site
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	550000 t/yr
Fraction of Regional tonnage used locally:	1
Continuous release	
Emission days	300 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater sediment. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
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	≥ 84.6 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %

Technical and organisational conditions and measures	
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	5300000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment	
This substance is consumed during use and no waste of the substance is generated	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.005	
Release fraction to wastewater from process (initial release prior to RMM):	0.00001	
Release fraction to soil from process (initial release prior to RMM):	0	

9.2.2. Control of worker exposure: Use of substance as a Fuel - Industrial (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

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

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (closed systems)	No other specific measures identified
Use as a fuel (closed systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Drum/batch transfers	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Bulk product storage	No other specific measures identified

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure Use of substance as a Fuel - Industrial (ERC7, ESVOC SPERC 7.12a.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

9.3.2. Worker exposure Use of substance as a Fuel - Industrial (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

9.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

9.4.2. Health

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

10. ES-10 - Professional; Use of substance as a Fuel - Professional

10.1. Title section

Use of substance as a Fuel - Professional	
ES Ref.: ES-10 ES Type: Environment - Worker	

Environment		Use descriptors
CS-10.1	Use of substance as a Fuel - Professional	ERC9a, ERC9b, ESVOC SPERC 9.12b.v1

Worker		Use descriptors
CS-10.2	Use of substance as a Fuel - Professional	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16

Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Use of substance as a Fuel - Professional (ERC9a, ERC9b, ESVOC SPERC 9.12b.v1)

ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
ESVOC SPERC 9.12b.v1	Use as a fuel: Professional (SU22)

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	100 %
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure
Other product characteristics	Substance is complex UVCB, Predominantly hydrophobic

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage	4400000 t/yr
Fraction of Regional tonnage used locally:	0.0005
Continuous release	
Emission days	365 days/yr

Technical and organisational conditions and measures	
Risk from environmental exposure is driven by freshwater. If discharging to municipal sewage treatment plant, no onsite wastewater treatment required.	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of	≥ 0 %
If discharging to municipal sewage treatment plant, provide the required onsite wastewater removal efficiency of	≥ 0 %

Technical and organisational conditions and measures	
Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.	

Conditions and measures related to sewage treatment plant	
Estimated substance removal from wastewater via municipal sewage treatment	94.7 %
Total efficiency of removal from wastewater after onsite and offsite municipal treatment plant) RMMs	94.7 %
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal	690000 kg/d
Assumed domestic sewage treatment plant flow	2000 m³/d

Conditions and measures related to treatment of waste (including article waste)	
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment	
This substance is consumed during use and no waste of the substance is generated	

Other conditions affecting environmental exposure		
Local freshwater dilution factor:	10	
Local marine water dilution factor:	100	
Release fraction to air from process (initial release prior to RMM):	0.001	
Release fraction to wastewater from process (initial release prior to RMM):	0.00001	
Release fraction to soil from process (initial release prior to RMM):	0.00001	

10.2.2. Control of worker exposure: Use of substance as a Fuel - Professional (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

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

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently)
	≤ 100
Vapour pressure	Liquid, vapour pressure 0.5 - 10 kPa at Standard Temperature and Pressure

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours,(unless stated differently)	

Other conditions affecting workers exposure	
Assumes use at not more than 20°C above ambient temperature, unless stated differently	
Assumes a good basic standard of occupational hygiene is implemented	
General measures (skin irritants)	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop
General exposures (closed systems)	No other specific measures identified
Use as a fuel (closed systems)	No other specific measures identified
Bulk transfers	No other specific measures identified
Equipment cleaning and maintenance	No other specific measures identified
Transfer from/pouring from containers	No other specific measures identified
Bulk product storage	No other specific measures identified

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure Use of substance as a Fuel - Professional (ERC9a, ERC9b, ESVOC SPERC 9.12b.v1)

Information for contributing exposure scenario
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model

10.3.2. Worker exposure Use of substance as a Fuel - Professional (PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16)

Information for contributing exposure scenario
Kerosene exhibits irritation to the skin and is classified H315 (Irritating to skin) accordingly. The available data for this adverse effect do not provide quantitative dose-response information, but there exists toxicity data appropriate to allow a qualitative risk characterisation; please see section 2 of the SDS for the necessary RMMs. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

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

10.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file - "Site-Specific Production" worksheet

10.4.2. Health

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