SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
Regulation (EC) No. 1907/2006 and Regulation (EC) No. 1272/2008

Supercedes date	Revision date	Revision Number
15/06/2021	30/04/2025	1

Country-Language: FIN-EN

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

1.1. Product identifier

Product Name Heavy fuel oil 180...380, sulphur grade; 220...2000 sulphur grade for industrial use; Neste heavy fuel oil HS180...380; HK220...2000 (PORH180,...,380; PORHK220...2000)

Product Code(s) 14359

Other means of identification 170232, 170233, 170286, 170282

REACH registration number 01-2119474894-22-0010
EC No (EU Index No) 270-675-6

CAS No. 68476-33-5

Pure substance/mixture Substance

Contains Fuel oil, residual

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

Recommended use
Manufacture of substance
Distribution of substance
Formulation & (re)packing of substances and mixtures
Use as an intermediate
Use as a fuel

Uses advised against Supported uses are listed above. Other uses are not recommended.

1.3. Details of the supplier of the safety data sheet

Supplier
Neste Oyj
Keilaranta 21, Espoo, P.O.B. 95, FIN-00095 NESTE, FINLAND
Tel. +358 10 45811
SDS@neste.com (chemical safety)

1.4. Emergency telephone number

Emergency Telephone :

Emergency Telephone - §45 - (EC)1272/2008	
Europe	**112**
Finland	+358 800 147 111, +358 9 471 977, Poison Information Centre
Sweden	När det är akut: 112, begär giftinformation. I mindre akuta fall 010-456 6700, Giftinformationscentralens direktnummer

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

Acute toxicity - Inhalation (Dusts/Mists)	Category 4 - (H332)
Germ cell mutagenicity	Category 2 - (H341)
Carcinogenicity	Category 1B - (H350)
Reproductive toxicity	Category 2 - (H361d)
Specific target organ toxicity — repeated exposure	Category 2 - (H373)
Acute aquatic toxicity	Category 1 - (H400)
Chronic aquatic toxicity	Category 1 - (H410)

2.2. Label elements

Contains Fuel oil, residual

Signal word
Danger

Hazard statements
H332 - Harmful if inhaled
H341 - Suspected of causing genetic defects
H350 - May cause cancer
H361d - Suspected of damaging the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure
H410 - Very toxic to aquatic life with long lasting effects
EUH066 - Repeated exposure may cause skin dryness or cracking

Precautionary Statements - EU (§28, 1272/2008)
P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P308 + P313 - IF exposed or concerned: Get medical advice/attention

2.3. Other hazards

Combustible liquid. Mainly non-volatile. Unloading gases:. (Hydrogen sulphide (H2S), Hydrocarbons):. Irritating to eyes. Irritating to respiratory system. High concentrations can depress the central nervous system. Contact with hot product can cause serious thermal burns.

This product does not contain substances considered to have endocrine disrupting properties at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Weight-%	REACH registration number	EC No (EU Index No)	Classification according to Regulation (EC) No. 1272/2008 [CLP]	Specific concentration limit (SCL)	M-Factor	M-Factor (long-term)
Fuel oil, residual 68476-33-5	100	01-2119474894-22	270-675-6	Acute Tox. 4 (H332) Muta. 2 (H341) Carc. 1B (H350) Repr. 2 (H361d) STOT RE 2 (H373) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)	-	1	1

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

This product does not contain candidate substances of very high concern at a concentration >=0.1% (Regulation (EC) No. 1907/2006 (REACH), Article 59)

Additional information
A petroleum product. or Mixture of a petroleum product and additives. Substance of Unknown or Variable composition, Complex reaction products or Biological materials (UVCB).

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation Obtain medical attention if oil mist is inhaled (risk of chemicals pneumonitis). Unloading gases:. (Hydrogen sulphide (H2S), Hydrocarbons):. Remove to fresh air. If symptoms persist, call a doctor. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Do not rub affected area. Get medical attention if irritation develops and persists.

Skin contact Wash skin with soap and water. Do not use solvents or thinners to dissolve the material. Take off contaminated clothing. Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.

Ingestion Do NOT induce vomiting. Get medical attention if symptoms occur.

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

Symptoms Repeated exposure may cause skin dryness or cracking. Harmful by inhalation. Oil mist may irritate eyes and respiratory tract. Unloading gases:. (Hydrogen sulphide (H2S), Hydrocarbons):. Causes eye irritation. Respiratory irritation. High concentrations can depress the central nervous system.

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

Note to doctors Treat symptomatically. Hydrogen sulphide (H2S):. May cause nausea, headache, dizziness and intoxication. Drowsiness.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable Extinguishing Media Foam. Carbon dioxide (CO2). Dry chemical.

Large Fire CAUTION: Use of water spray when fighting fire may be inefficient.

Unsuitable extinguishing media Do not scatter spilled material with high pressure water streams.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical Containers may explode when heated.

Hazardous combustion products Carbon monoxide. Hydrogen sulphide. Oxides of sulphur. H2SO4.

5.3. Advice for firefighters

Special protective equipment and precautions for fire-fighters Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Prevent fire extinguishing water from contaminating surface water or the ground water system.

Wear positive pressure self-contained breathing apparatus (SCBA).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Avoid breathing vapours or mists. Ensure adequate ventilation. Do not touch or walk through spilled material.

For emergency responders Evacuate area. Keep people away from and upwind of spill/leak. Prevent unauthorized access. Pay attention to the fire and health hazards caused by the product. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use personal protective equipment as required.

6.2. Environmental precautions

Environmental precautions Risk of soil and ground water contamination. Avoid release to the environment. Keep out of drains, sewers, ditches and waterways.

6.3. Methods and material for containment and cleaning up

Methods for containment Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air). Stop leak if you can do it without risk.

Methods for cleaning up Pay attention to the fire and health hazards caused by the product. Immediately start clean-up of the liquid and contaminated soil. Allow hot product solidify first (if there is no risk of spreading into the environment). Solid product can be taken up. Take up with sand or other noncombustible absorbent material and place into containers for later disposal. Stains can be cleaned with a hydrocarbon solvent.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Reference to other sections See Section 7 for more information, See section 8 for more information. See section 13 for more information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling Remove all sources of ignition. Take precautionary measures against static discharges. Product is usually handled heated. When handling heated product wear thermally insulated protective equipment. Handling and storage temperature must not exceed the flash point. Avoid skin contact and inhalation of oil mist. Use personal protective equipment and/or local ventilation when needed.

Unloading gases:. :. Avoid breathing vapours or mists. (H2S, Hydrocarbons). Use only outdoors or in a well-ventilated area.

During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons). Hydrogen sulphide.

General hygiene considerations Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Flammable liquid storage. Can be stored heated. Store in a demarcated bunded area to prevent release to drains and/or watercourses. Change contaminated thermal insulation material (autoignition hazard).

7.3. Specific end use(s)

Risk Management Methods (RMM) Not applicable.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure Limits Oil mist: 5 mg/m³ (8h) HTP 2020/FIN. Hydrogen sulfide: 5 ppm (8h), 7 mg/m³ (8h), 10 ppm (15 min), 14 mg/m³ (15 min) HTP 2020/FIN, EU OELV (EC/2009/161).

Derived No Effect Level (DNEL) - Workers

Chemical name	Oral	Dermal	Inhalation
Fuel oil, residual 68476-33-5	-	0.065 mg/kg bw/day [4] [6]	0.18 mg/m³, (8h) Aerosol [4] [6] 4700 mg/m³, (15 min) Aerosol

Chemical name	Oral	Dermal	Inhalation
			[4] [7]

Notes

[4]	Systemic health effects.
[6]	Long term.
[7]	Short term.

Derived No Effect Level (DNEL) - General Public No information available.

Predicted No Effect Concentration (PNEC)

Chemical name	Freshwater sediment	Marine sediment	Sewage treatment	Soil	Food chain
Fuel oil, residual 68476-33-5	-	-	-	-	66.7 mg/kg (food, secondary poisoning)

8.2. Exposure controls

Engineering controls Provide adequate ventilation. Use personal protective equipment and/or local ventilation when needed. Product is usually handled heated. When handling heated product wear thermally insulated protective equipment. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).

Personal protective equipment

Eye/face protection Tight sealing safety goggles. Face shield when needed.

Hand protection Thick, thermally insulated protective gloves. It is recommended that gloves are made of the following material:. Polyvinyl chloride (PVC). Nitrile rubber. Change protective gloves regularly. Protective gloves according to standards EN 374 and EN 407.

Skin and body protection Protective clothing when needed. When handling heated product wear thermally insulated protective equipment.

Respiratory protection Filter must be changed often enough. Gas and combination filter cartridges must comply with EN 14387. Wear a respirator fitted with the following cartridge:. Combination filter, type AB2/P3. Filter device could be used maximum 2 hours at a time. Filter devices must not be used in conditions where the oxygen level is low (< 19 vol.-%). At high concentrations a breathing apparatus must be used (self-contained or fresh air hose breathing apparatus).

General hygiene considerations Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Store in a demarcated bunded area to prevent release to drains and/or watercourses. Take precautions against leakage by constructing collecting pools and sewerage systems as well as by surfacing the loading and unloading stations.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid
Colour	black
Odour	Strong. Characteristic.
Odour threshold	No information available

Property	Values	Remarks • Method
Melting point / freezing point	< 30 °C	Pour Point (ISO 3016)
Initial boiling point and boiling range	150 - > 750 °C	
Flammability	-	
Flammability Limit in Air		
Upper flammability or explosive limits	~ 6 %	
Lower flammability or explosive limits	~ 1 %	
Flash point	>= 65 °C	
Autoignition temperature	> 400 °C	
Decomposition temperature	-	
pH	No data available	
pH (as aqueous solution)	No data available	
Kinematic viscosity	≥ 20 mm2/s @ 50°C	
Dynamic viscosity	-	
Water solubility	The product has poor water-solubility.	
Solubility(ies)	-	
Partition coefficient	log Kow: 4 -> 6	
Vapour pressure	< 1 kPa @ 38°C	
Relative density	~ 0,9 - 1,0 @ 15/4°C	
Bulk density	-	
Liquid Density	-	
Relative vapour density	-	
Particle characteristics		
Particle Size	-	
Particle Size Distribution	-	

9.2. Other information

9.2.1. Information with regards to physical hazard classes

Explosive properties	Not considered to be explosive
Oxidising properties	Does not meet the criteria for classification as oxidising

9.2.2. Other safety characteristics
No information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity There are no known reactivity hazards associated with this product.

10.2. Chemical stability

Stability Stable under normal conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions None under normal processing.

10.4. Conditions to avoid

Conditions to avoid Heat, flames and sparks.

10.5. Incompatible materials

Incompatible materials Oxidising agent.

10.6. Hazardous decomposition products

Hazardous decomposition products Hydrogen sulphide. Combustion ash contains inorganic nickel and vanadium compounds, which are hazardous to health.

SECTION 11: Toxicological information

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

Information on likely routes of exposure

Acute toxicity Harmful if inhaled

Numerical measures of toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Fuel oil, residual	4320 - 5270 mg/kg, Rat (OECD 401)	> 2000 mg/kg, Rabbit (EC B.3, OECD 434)	4100 mg/m^3, Rat (EPA OTS 798.1150)

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation Based on available data, the classification criteria are not met. Repeated exposure may cause skin dryness or cracking. (OECD 404).

Serious eye damage/eye irritation Based on available data, the classification criteria are not met. (EC B.5).

Respiratory or skin sensitisation Based on available data, the classification criteria are not met. (OECD 406).

Germ cell mutagenicity May cause genetic defects.

The table below indicates ingredients above the cut-off threshold considered as relevant which are listed as mutagenic.

Chemical name	European Union
Fuel oil, residual	Muta. 2

Carcinogenicity May cause cancer. (OECD 451).

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical name	European Union
Fuel oil, residual	Carc. 1B

Reproductive toxicity Suspected of damaging the unborn child. (EPA OTS 798.4900).

The table below indicates ingredients above the cut-off threshold considered as relevant which are listed as reproductive toxins.

Chemical name	European Union
Fuel oil, residual	Repr. 2

STOT - single exposure Based on available data, the classification criteria are not met.

STOT - repeated exposure May cause damage to organs through prolonged or repeated exposure. (EPA OPPTS 870.3250).

Aspiration hazard Based on available data, the classification criteria are not met.

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Endocrine disrupting properties This product does not contain substances considered to have endocrine disrupting properties at levels of 0.1% or higher.

11.2.2. Other information

Other adverse effects Especially fresh product may contain traces of highly toxic hydrogen sulphide, which irritates severely eyes and respiratory tract. High concentrations can depress the central nervous system. The product contains traces of nickel and vanadium compounds, which are hazardous to health.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicity Very toxic to aquatic life with long lasting effects. 0.1 < L(E)C50 ≤ 1.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Fuel oil, residual	OECD 201, 72 hours, Pseudokirchneriella subcapitata, WAF EL50: 0,32 mg/l	OECD 203, 96 hours, Oncorhynchus mykiss (Rainbow trout), WAF LL_{50}: 79 mg/l	QSAR (Heavy fuel oil), 72 hours, Micro-organisms (wastewater sludge), Tetrahymena pyriformis: LL_{50}: > 1000 mg/l	OECD 202, 48 hours, Daphnia magna, WAF: EL50: 0,22 mg/l QSAR (Heavy fuel oil) 21

	EPA-600/9-018, 72 hours, Pseudokirchneriella subcapitata, WAF NOELR: 0,05 mg/l	QSAR (Heavy fuel oil), 28 days, Oncorhynchus mykiss (Rainbow trout) NOEL: 0,1 mg/l	NOEL: 14,9 mg/l	days, Daphnia magna: NOEL: 0,27 mg/l

12.2. Persistence and degradability

Persistence and degradability The product is slowly degradable. Lightest hydrocarbons are volatile.

12.3. Bioaccumulative potential

Bioaccumulation May bioaccumulate.

Chemical name	Partition coefficient
Fuel oil, residual	log Kow: 4 -> 6

12.4. Mobility in soil

Mobility in soil Insoluble in water. Mainly non-volatile. The product contains substances which are bound to particulate matter and are retained in soil.

12.5. Results of PBT and vPvB assessment

Chemical name	PBT and vPvB assessment
Fuel oil, residual	The substance is not PBT / vPvB

12.6. Endocrine disrupting properties

Endocrine disrupting properties This product does not contain substances considered to have endocrine disrupting properties at levels of 0.1% or higher.

12.7. Other adverse effects

Product causes fouling, and direct contact produces harmful effects e.g. to birds and vegetation. Adsorbed hydrocarbon residues can be harmful to sediment organisms.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. When handling waste, the safety precautions applying to handling of the product should be considered.

Contaminated packaging Do not reuse empty containers.

SECTION 14: Transport information

IATA

14.1 UN number or ID number 3082

14.2 UN proper shipping name Environmentally hazardous substance, liquid, n.o.s.(Fuel Oil)

14.3 Transport hazard class(es) 9
14.4 Packing group III
14.5 Environmental hazards Yes
14.6 Special precautions for user .

IMDG
14.1 UN number or ID number 3082
14.2 UN proper shipping name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(FUEL OIL)
14.3 Transport hazard class(es) 9
14.4 Packing group III
14.5 Environmental hazard Marine pollutant
14.6 Special precautions for user .
Special Provisions -
14.7 Maritime transport in bulk according to IMO instruments No

RID
14.1 UN number or ID number 3082
14.2 UN proper shipping name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (FUEL OIL)
14.3 Transport hazard class(es) 9
14.4 Packing group III
14.5 Environmental hazard Yes
14.6 Special precautions for user .
Classification code 90

ADR
14.1 UN number or ID number 3082
14.2 UN proper shipping name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(FUEL OIL)
14.3 Transport hazard class(es) 9
14.4 Packing group III
14.5 Environmental hazard Yes
14.6 Special precautions for user
Classification code 90
Tunnel restriction code (-)
.

SECTION 15: Regulatory information

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

National regulations

European Union
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

Authorisations and/or restrictions on use:
This product contains one or more substance(s) subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII)

Chemical name	Restricted substance per REACH Annex XVII	Substance subject to authorisation per REACH Annex XIV

Fuel oil, residual - 68476-33-5	28. 75.	-

Persistent Organic Pollutants
Not applicable

Dangerous substance category per Seveso Directive (2012/18/EU)
E1 - Hazardous to the Aquatic Environment in Category Acute 1 or Chronic 1

Named dangerous substances per Seveso Directive (2012/18/EU)

Chemical name	Lower-tier requirements (tons)	Upper-tier requirements (tons)
Fuel oil, residual - 68476-33-5	-	25000

Ozone-depleting substances (ODS) regulation (EC) 1005/2009
Not applicable

Other Regulations Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH).
Classification according to Regulation (EC) No. 1272/2008 [CLP].

15.2. Chemical safety assessment

Chemical Safety Report Chemical Safety Assessments have been carried out for these substances

SECTION 16: Other information

Key or legend to abbreviations and acronyms used in the safety data sheet

Full text of H-Statements referred to under section 3
H332 - Harmful if inhaled
H341 - Suspected of causing genetic defects
H350 - May cause cancer
H361d - Suspected of damaging the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure
H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Legend
SVHC: Substances of Very High Concern for Authorisation:

Legend Section 8: Exposure controls/personal protection

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation
+	Sensitisers		

Classification procedure	
Classification according to Regulation (EC) No. 1272/2008 [CLP]	Method Used
Acute oral toxicity	Calculation method

Acute dermal toxicity	Calculation method
Acute inhalation toxicity - gas	Calculation method
Acute inhalation toxicity - vapour	Calculation method
Acute inhalation toxicity - dust/mist	Calculation method
Skin corrosion/irritation	Calculation method
Serious eye damage/eye irritation	Calculation method
Respiratory sensitisation	Calculation method
Skin sensitisation	Calculation method
Mutagenicity	Calculation method
Carcinogenicity	Calculation method
Reproductive toxicity	Calculation method
STOT - single exposure	Calculation method
STOT - repeated exposure	Calculation method
Acute aquatic toxicity	Calculation method
Chronic aquatic toxicity	Calculation method
Aspiration hazard	Calculation method
Ozone	Calculation method

Supercedes date 15/06/2021

Revision date 30/04/2025

Reason for revision Change in the mixture classification
(new SDS software has been introduced)

Further information Key literature references and sources for data:

CONCAWE Report 15/24: Hazard classification and labelling of petroleum substances in the European Economic Area - 2024.
Chemical Safety Report Fuel Oil.

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)
Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Exposure scenario
Use of Substance as Intermediate - Industrial

Identification

Product name	Fuel oil, residual
CAS number	68476-33-5
EC number	270-675-6
Version number	2018
Es reference	ES01b

1. Title of exposure scenario

Main title	Use of Substance as Intermediate - Industrial
Process scope	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).
Sector of use	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals

Environment

Environmental release category	ERC6a Use of intermediate
SPERC	ESVOC SPERC 6.1a.v1

Worker

Process category	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.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 1.8E+06 tonnes/year
Fraction of Regional tonnage used locally: 8.3E-03
Annual site tonnage: 1.5E+04 tonnes
Maximum daily site tonnage: 5.0E+04 kg

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Use of Substance as Intermediate - Industrial

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 1.0E-04
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 9.9E-07
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.001

Environmental factors not influenced by risk management measures

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

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used.
	Risk from environmental exposure is driven by terrestrial secondary poisoning.
STP details	Not applicable as there is no release to wastewater. Estimated substance removal from wastewater via domestic sewage treatment: 94.2% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.2% Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 7.3E+04 kg/day Assumed domestic sewage treatment plant flow (m³/day): 2000.

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

Air	Treat air emission to provide a typical removal efficiency of 80%.
Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): ≥ 0.0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ 0.0%. Prevent discharge of undissolved substance to or recover from onsite waste water.
Soil	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	This substance is consumed during use and no waste of the substance is generated.

Conditions and measures related to external recovery of waste

Recovery method	This substance is consumed during use and no waste of the substance is generated.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting	Assumes a good basic standard of occupational hygiene is implemented.
Temperature	Operation is carried out at elevated temperature (> 20°C above ambient temperature).

Use of Substance as Intermediate - Industrial

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Risk management measures

Use of Substance as Intermediate - Industrial

General exposures (closed systems)
Handle substance within a closed system.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Process sampling
Outdoor.
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk product storage
Store substance within a closed system.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Laboratory activities
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Wear suitable gloves tested to EN374.
.
Marine vessel/barge (un)loading.
Avoid carrying out activities involving exposure for more than 4 hours.
Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Road tanker/rail car loading.
Ensure material transfers are under containment or extract ventilation.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Equipment cleaning and maintenance
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

3. Exposure estimation (Environment 1)

Assessment method

Used Petrorisk model. (Hydrocarbon Block Method)

Risk-driving RCR - air compartment driven 6.9E-01
Risk-driving RCR - water compartment driven 1.1E-02

4. Guidance to check compliance with the exposure scenario (Environment 1)

Use of Substance as Intermediate - Industrial

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 onsite 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).

3. Exposure estimation (Health 1)

Assessment method

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

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Qualitative approach used to conclude safe use.

4. Guidance to check compliance with the exposure scenario (Health 1)

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.

Exposure scenario
Distribution of Substance - Industrial

Identification

Product name	Fuel oil, residual
CAS number	68476-33-5
EC number	270-675-6
Version number	2018
Es reference	ES01a

1. Title of exposure scenario

Main title	Distribution of Substance - Industrial
Process scope	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.
Sector of use	NA

Environment

Environmental release category	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
SPERC	ESVOC SPERC 1.1b.v1

Worker

Process category	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.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 9.3E+06 tonnes/year
Fraction of Regional tonnage used locally: 2.0E-03
Annual site tonnage: 1.9E+04 tonnes
Maximum daily site tonnage: 6.2E+04 kg

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 1.0E-03
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1.0E-06
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.00001

Environmental factors not influenced by risk management measures

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

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used.
	Risk from environmental exposure is driven by terrestrial secondary poisoning.
STP details	Not applicable as there is no release to wastewater. Estimated substance removal from wastewater via domestic sewage treatment: 94.2% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.2% Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 8.9E+04 kg/day Assumed domestic sewage treatment plant flow (m³/day): 2000.

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

Air	Treat air emission to provide a typical removal efficiency of 90%.
Water	No wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): ≥ 0.0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 0.0%.
Soil	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid

Distribution of Substance - Industrial

Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting	Assumes a good basic standard of occupational hygiene is implemented.
Temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Risk management measures

Distribution of Substance - Industrial

Process sampling
Outdoor.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
General exposures (closed systems)
Handle substance within a closed system.
Avoid carrying out activities involving exposure for more than 4 hours.
Sample via a closed loop or other system to avoid exposure.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk product storage
Store substance within a closed system.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Product sampling
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Laboratory activities
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Wear suitable gloves tested to EN374.
.
Marine vessel/barge (un)loading.
Avoid carrying out activities involving exposure for more than 4 hours.
Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Road tanker/rail car loading.
Ensure material transfers are under containment or extract ventilation.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Equipment cleaning and maintenance
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

3. Exposure estimation (Environment 1)

Distribution of Substance - Industrial

Assessment method	Used Petrorisk model. (Hydrocarbon Block Method) Maximum Risk Characterisation Ratios for air emissions 7.0E-01 Maximum Risk Characterisation Ratios for wastewater emissions 1.3E-02

4. Guidance to check compliance with the exposure scenario (Environment 1)

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 onsite 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).

3. Exposure estimation (Health 1)

Assessment method	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Qualitative approach used to conclude safe use.

4. Guidance to check compliance with the exposure scenario (Health 1)

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.

Exposure scenario
Formulation & (Re)packing of Substances and Mixtures - Industrial

Identification

Product name	Fuel oil, residual
CAS number	68476-33-5
EC number	270-675-6
Version number	2018
Es reference	ES02

1. Title of exposure scenario

Main title	Formulation & (Re)packing of Substances and Mixtures - Industrial
Process scope	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
Sector of use	NA

Environment

Environmental release category	ERC2 Formulation into mixture
SPERC	ESVOC SPERC 2.2.v1

Worker

Process category	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.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 7.5E+06 tonnes/year
Fraction of Regional tonnage used locally: 4.0E-03
Annual site tonnage: 3.0E+04 tonnes
Maximum daily site tonnage: 100 tonnes

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Formulation & (Re)packing of Substances and Mixtures - Industrial

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements): 2.5E-03
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 9.5E-06
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.0001

Environmental factors not influenced by risk management measures

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

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used.
	Risk from environmental exposure is driven by terrestrial secondary poisoning.
STP details	Not applicable as there is no release to wastewater. Estimated substance removal from wastewater via domestic sewage treatment: 94.2% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.2% Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 1.1E+05 kg/day Assumed domestic sewage treatment plant flow (m³/day): 2000.

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

Air	Treat air emission to provide a typical removal efficiency of 0%.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): ≥ 60.9. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 0.0%. Prevent discharge of undissolved substance to or recover from onsite waste water. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Soil	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Formulation & (Re)packing of Substances and Mixtures - Industrial

Setting	Assumes a good basic standard of occupational hygiene is implemented.
Temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Risk management measures

Formulation & (Re)packing of Substances and Mixtures - Industrial

General exposures (closed systems)
Process sampling
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
General exposures (closed systems)
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk product storage
Store substance within a closed system.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Product sampling
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 15 minutes.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Laboratory activities
Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure.
Wear suitable gloves tested to EN374.
.
Marine vessel/barge (un)loading.
Transfer via enclosed lines.
Avoid carrying out activities involving exposure for more than 4 hours.
Clear transfer lines prior to de-coupling.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Road tanker/rail car loading.
Ensure material transfers are under containment or extract ventilation.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Drum/batch transfers
Ensure material transfers are under containment or extract ventilation.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
, or:
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 1 hour.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Equipment cleaning and maintenance

Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

3. Exposure estimation (Environment 1)

Assessment method

Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 7.0E-01
Maximum Risk Characterisation Ratios for wastewater emissions 1.5E-01

4. Guidance to check compliance with the exposure scenario (Environment 1)

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 onsite 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).

3. Exposure estimation (Health 1)

Assessment method

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

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Qualitative approach used to conclude safe use.

4. Guidance to check compliance with the exposure scenario (Health 1)

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.

Exposure scenario
Use as a Fuel - Industrial

Identification

Product name	Fuel oil, residual
CAS number	68476-33-5
EC number	270-675-6
Version number	2018
Es reference	ES12a

1. Title of exposure scenario

Main title	Use as a Fuel - Industrial
Process scope	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Sector of use	NA

Environment

Environmental release category	ERC7 Use of functional fluid at industrial site
SPERC	ESVOC SPERC 7.12a.v1

Worker

Process category	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

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 5.9E+06 tonnes/year
Fraction of Regional tonnage used locally: 2.6E-01
Annual site tonnage: 1.5E+06 tonnes
Maximum daily site tonnage: 5000 tonnes

Frequency and duration of use

Continuous release.
Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Use as a Fuel - Industrial

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 2.0E-04
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1.9E-07
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0

Environmental factors not influenced by risk management measures

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

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used.
	Risk from environmental exposure is driven by terrestrial secondary poisoning.
STP details	Not applicable as there is no release to wastewater. Estimated substance removal from wastewater via domestic sewage treatment: 94.2% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.2% Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 7.2E+06 kg/day Assumed domestic sewage treatment plant flow (m³/day): 2000.

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

Air	Treat air emission to provide a typical removal efficiency of 95%.
Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): ≥ 61.1. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 0.0%.
Soil	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method	This substance is consumed during use and no waste of the substance is generated.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

	Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting	Assumes a good basic standard of occupational hygiene is implemented.
Temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Use as a Fuel - Industrial

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Risk management measures

Use as a Fuel - Industrial

General exposures (closed systems)
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
General exposures (closed systems)
Product sampling
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 1 hour.
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk closed unloading
Outdoor.
Transfer via enclosed lines.
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Drum/batch transfers
Ensure material transfers are under containment or extract ventilation.
, or:
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 1 hour.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Operation of solids filtering equipment
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk product storage
Store substance within a closed system.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Avoid carrying out activities involving exposure for more than 4 hours.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Use as a fuel
(closed systems)
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Equipment cleaning and maintenance
Drain down and flush system prior to equipment break-in or maintenance.
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

Use as a Fuel - Industrial

3. Exposure estimation (Environment 1)

Assessment method

Used Petrorisk model. (Hydrocarbon Block Method)

Maximum Risk Characterisation Ratios for air emissions 6.9E-01
Maximum Risk Characterisation Ratios for wastewater emissions 1.5E-01

4. Guidance to check compliance with the exposure scenario (Environment 1)

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 onsite 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).

3. Exposure estimation (Health 1)

Assessment method

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

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Qualitative approach used to conclude safe use.

4. Guidance to check compliance with the exposure scenario (Health 1)

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.

Exposure scenario
Use as a Fuel - Professional

Identification

Product name	Fuel oil, residual
CAS number	68476-33-5
EC number	270-675-6
Version number	2018
Es reference	ES12b

1. Title of exposure scenario

Main title	Use as a Fuel - Professional
Process scope	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Sector of use	NA

Environment

Environmental release category	ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
SPERC	ESVOC SPERC 9.12b.v1

Worker

Process category	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

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Substance is complex UVCB. Predominantly hydrophobic.

Amounts used

Fraction of EU tonnage used in region: 0.1
Regional use tonnage: 1.7E+06 tonnes/year
Fraction of Regional tonnage used locally: 5.0E-04
Annual site tonnage: 8.5E+02 tonnes
Maximum daily site tonnage: 2.3E+03 kg

Frequency and duration of use

Continuous release.
Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Use as a Fuel - Professional

Emission factor - air	Release fraction to air from wide dispersive use (regional only): 1.0E-04
Emission factor - water	Release fraction to wastewater from wide dispersive use: 7.0E-10
Emission factor - soil	Release fraction to soil from wide dispersive use (regional only): 0.00001

Environmental factors not influenced by risk management measures

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

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used. Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion).
STP details	Not applicable as there is no release to wastewater. Estimated substance removal from wastewater via domestic sewage treatment: 94.2% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.2.% Maximum allowable site tonnage (Msafe), based on release following total wastewater treatment removal: 3.8E+03 kg/day Assumed domestic sewage treatment plant flow (m³/day): 2000.

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

Air	Treat air emission to provide a typical removal efficiency of N/A%.
Water	No wastewater treatment required. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): ≥ 0.0. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 0.0%.
Soil	Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method	This substance is consumed during use and no waste of the substance is generated.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure < 0.5 kPa at STP.
Concentration details	Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Setting	Assumes a good basic standard of occupational hygiene is implemented.
Temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Use as a Fuel - Professional

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	General measures (carcinogens) Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Risk management measures

Use as a Fuel - Professional

General exposures (closed systems)
Product sampling
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 1 hour.
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
.
General exposures (closed systems)
Handle substance within a closed system.
Sample via a closed loop or other system to avoid exposure.
Avoid carrying out activities involving exposure for more than 1 hour.
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Bulk closed unloading
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
, or:
Ensure material transfers are under containment or extract ventilation.
.
Drum/batch transfers
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
, or:
Ensure material transfers are under containment or extract ventilation.
.
Refuelling
Ensure material transfers are under containment or extract ventilation.
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Avoid carrying out activities involving exposure for more than 1 hour.
.
Use as a fuel
(closed systems)
Wear chemically-resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
.
Equipment cleaning and maintenance
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Wear chemically-resistant gloves (tested to EN374) in combination with specific activity training.
Drain down and flush system prior to equipment break-in or maintenance.
Retain drain-downs in sealed storage pending disposal or for subsequent recycle.
Clear spills immediately.

3. Exposure estimation (Environment 1)

Use as a Fuel - Professional

Assessment method	Used Petrorisk model. (Hydrocarbon Block Method) Maximum Risk Characterisation Ratios for air emissions 5.6E-01 Maximum Risk Characterisation Ratios for wastewater emissions 3.2E-03

4. Guidance to check compliance with the exposure scenario (Environment 1)

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 onsite 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).

3. Exposure estimation (Health 1)

Assessment method	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. Available hazard data do not support the need for a DNEL to be established for other health effects. Qualitative approach used to conclude safe use.

4. Guidance to check compliance with the exposure scenario (Health 1)

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.