Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Material Name:	**Fuel oil WRD (CAS 64742-87-6)**
REACH Registration No.:	01-2119485284-32
Synonyms:	Fuel oil WRD (Wide Range Distillate), MDF WRD (DMC), WRD Feed

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

Product Use: Fuel for boilers, gas turbines and other combustion equipment.
Diesel engines in marine or stationary operation.
Distribution of substance, industrial
Formulation & (re) packing of the substances and mixtures, industrial
Use as a fuel, industrial
Use as a fuel, professional

Uses Advised Against: Applications that are not registered and risk assessed.

1.3 Details of the supplier of the substance or mixture

Manufacturer/Supplier: St1 Refinery AB
Box 8889
402 72 Gothenburg, Sweden

Telephone: +46 (0) 31 744 6000

Email Contact for MSDS: bransle@st1.se or Supply-Sweden@st1.se

1.4 Emergency Telephone Number: 112 SOS Alarm
Swedish Poisons Information Centre: +46 (0)8 331 231

2. HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

Product definition : Substance

Regulation (EC) No 1272/2008 (CLP)	
Hazard classes / Hazard categories	**Hazard Statement**
Flammable liquids, Category 3	H226
Aspiration hazard, Category 1	H304
Skin corrosion/irritation, Category 2	H315
Acute toxicity, Category 4; Inhalation	H332
Carcinogenicity, Category 2	H351
Specific target organ toxicity - repeated exposure, Category 2; Blood.; Liver.; Thymus.	H373
Chronic hazards to the aquatic environment, Category 2	H411

Classification triggering components: Contains petroleum distillates.

2.2 Label Elements

Labeling according to Regulation (EC) No 1272/2008

Symbol(s):

Signal Words: Danger

CLP Hazard Statements:

PHYSICAL HAZARDS:
H226: Flammable liquid and vapor.

HEALTH HAZARDS:
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H332: Harmful if inhaled.
H351: Suspected of causing cancer.
H373: May cause damage to organs through prolonged or repeated exposure.

ENVIRONMENTAL HAZARDS:
H411: Toxic to aquatic life with long lasting effects.

CLP Precautionary statements:

PREVENTION:
P201; P210; P233; P240; P241; P243; P260; P264; P270; P271; P273; P280

RESPONSE:
P301+P310, P302+P352, P303+P361+P353, P304+P340, P308+P313, P312, P331, P332+P313, P370+P378, P391

STORAGE:
P403+P235, P403+P233, P405

DISPOSAL:
P501

For more information regarding CLP Precautionary statements, see chapter 16.

2.3 Other Hazards

Safety Hazards: May ignite on surfaces at temperatures above auto-ignition temperature. Vapours in the upper part of tanks and container can ignite and explode at temperatures exceeding the auto ignition temperature, at concentrations in the gas phase within the flammable range. Not classified as flammable under this legislation. Electrostatic charges may be generated during pumping. Static electricity can cause fires.
The substance does not fulfil all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB. PBT =Persistent, Bioaccumulative, Toxic.
vPvB = very Persistent, very Bioaccumulative.

Other information: This product is intended for use in closed systems only.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

Cas nr. 64742-87-6

Preparation Description: Feeds obtained from the vacuum distillation of atmospheric residues and which contains saturated and aromatic hydrocarbons, C11 through C25. May also contain several additives at levels of <0.1% vol. May contain catalytically cracked oils with polycyclic aromatic compounds, mainly 3-ring but some 4 to 6 rings.
Product is not a mixture according regulation 1907/2006/EC.

Hazardous Components

Classification of components according to Regulation (EC) No 1272/2008

Chemical Name	CAS No.	EINECS	REACH Registration No.	Conc. vol%
Fuels, diesel	64742-87-6	265-190-1	01-2119485284-32	100

Chemical Name	Hazard Class & Category	Hazard Statement
Fuels, diesel	Flam. Liq., 3; Asp. Tox., 1; Acute Tox., 4; Skin Corr., 2; Carc., 2; STOT RE, 2; Aquatic Chronic, 2	H226; H304; H315; H332; H351; H373; H411

3.2 Mixtures: Not applicable.

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

Inhalation: Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

Skin contact: Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye contact: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion: If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 37 °C, shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth.

4.2 Most important symptoms/effects, acute & delayed: If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

4.3 Indication of immediate medical attention and special treatment needed:	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

5.1 Extinguishing Media:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media:	Do not use water in a jet. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
5.2 Special hazards arising from substance or mixture:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Oxides of sulphur. Unidentified organic and inorganic compounds. Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point.
5.3 Advice for fire-fighters:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly.

6.1 Personal Precautions, Protective Equipment and Emergency Procedures:	Do not breathe fumes, vapour. Do not operate electrical equipment.
6.2 Environmental Precautions:	Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and firefighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its

	flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
6.3 Methods and Material for Containment	For small liquid spills, transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Absorb with a suitable absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Place in a suitable container with clearly marked container for disposal or recovery in accordance with local regulations. For large liquid spills, transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Absorb with a suitable absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.
Additional Advice:	Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

7. HANDLING AND STORAGE

General Precautions:	Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Prevent spillages. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier.
7.1 Precautions for Safe Handling:	Avoid inhaling vapour and/or mists. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Extinguish any naked flames. Do not smoke. Remove ignition

	sources. Avoid sparks. Earth all equipment. Avoid prolonged or repeated contact with skin. When using do not eat or drink. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
7.2 Conditions for safe storage, including any incompatibilities:	Drum and small container storage: Drums should be stacked to a maximum of 3. Use properly labelled and closable containers. Tank storage: Tanks must be specifically designed for this product. Storage tanks for large volumes should be bunded. Locate tanks away from heat and ignition sources. The vapour is heavier than air. Be aware of the risk of accumulation in pits and confined spaces. Gases from tanks should not be released into the atmosphere. Evaporation losses during storage must be controlled by a suitable vapour recovery. Keep in a bunded area with low permeability to prevent leakage. To prevent ingress of water.
7.3 Specific End Uses:	Please refer to Ch16 and/or the annexes for the registered uses under REACH.
Additional Information:	Ensure that all local regulations regarding handling and storage are followed. Exposure to this product should be reduced to a minimum.
Product Transfer:	Avoid splash filling. Wait 2 minutes after tank filling (for tanker tanks) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep container closed when not in use. Do not use compressed air for filling, discharging or handling. Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that previously contained gasoline. This vapour may explode if there is an ignition source. Partially filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling special care.
Recommended Materials:	Use mild steel or stainless steel containers or container linings. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.
Unsuitable Materials :	Some synthetic materials may be unsuitable for containers or linings depending on the material specification and use. Examples of materials that should be avoided are natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC) and polyisobutylene. However, some may be suitable for glove materials.
Other Information:	Ensure that all local regulations regarding handling and storage are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.

8.1 Control Parameters

Occupational Exposure Limits (OEL)

Not established

Biological Exposure Index (BEI)

Not established

Derived No Effect Levels (DNEL)

Component	Exposure Route	Exposure Type Long/short	Application Area	Value
Fuels, diesel	Inhalation	Acute, systemic effects	Worker	4300 mg/m3/ 15 min (aerosol)
	Dermal	Long term, systemic effects	Worker	2,9 mg/kg 8 h
	Inhalation	Long term, systemic effects	Worker	68 mg/m3/8 h (aerosol)
	Inhalation	Acute, systemic effects	Consumer	2600 mg/m3/15 min (aerosol)
	Dermal	Long term, systemic effects	Consumer	1,3 mg/kg 24 h
	Inhalation	Long term, systemic effects	Consumer	20 mg/m3/24 h (aerosol)

PNEC (Predicted No-Effect Concentration) related information: Substance is a hydrocarbon with a complex, unknown or variable composition. Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances.

8.2 Exposure Controls
General Information: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Occupational Exposure Controls

Personal Protective Equipment:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
Eye Protection:	Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166.
Hand Protection:	Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, and dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Select gloves tested to a relevant standard (e.g. Europe EN374 for chemical resistance and EN407 for heat resistance). For prolonged or repeated contact, use nitrile gloves. (Breakthrough time of > 240 minutes.) For incidental contact/splash, use Neoprene/PVC gloves.
Body protection:	Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
Respiratory Protection:	If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in accordance with local regulations. Select a filter suitable for organic gases and vapours [boiling point >65 °C] meeting EN14387.
Monitoring Methods:	Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental exposure control measures:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Exposure Control: Measures for Consumers	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide

employee skin care programmes. Do not ingest. If swallowed then seek immediate medical assistance.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

According to Swedish Standard SS 15 54 10:2011.

Appearance:	Yellow liquid
Odour:	Characteristic hydrocarbon odour
Odour threshold:	-
pH:	Not applicable
Melting point/freezing point:	±0 °C
Initial boiling point and boiling range:	170-390°C
Flash point:	>60 °C
Evaporation rate:	-
Flammability (solid, gas)	-
Upper/lower flammability or explosive limits:	1 – 6 % (V)
Vapour pressure, at 37,8 °C:	<1 hPa
Vapour density:	-
Relative density:	Typical 880 kg/m3
Solubility(ies):	Not solubility
Partition coefficient: n-octanol/water:	-
Auto-ignition temperature:	> 220°C
Decomposition temperature:	-
Kinematics Viscosity, 40°C	10-40 mm2/s
Explosive properties:	Not considered to be explosive
Oxidising properties:	Not considered to oxidise

9.2 Other Information

Other Information : Not applicable.

10. STABILITY AND REACTIVITY

10.1 Reactivity: The product is not considered to be reactive.

10.2 Chemical Stability: Stable under normal conditions of use.

10.3 Possibility of Hazardous Under normal conditions of storage and use, there are no

Reactions:	dangerous reactions.
10.4 Conditions to Avoid:	Avoid heat, sparks, open flames and other ignition sources.
10.5 Incompatible Materials:	Strong oxidising agents.
10.6 Hazardous Decomposition Product:	Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXIKOLOGISK INFORMATION

11.1 Information on Toxicological effects

Basis for Assessment:	Information given is based on product data, knowledge of the components and the toxicology of similar products.
Likely routes of exposure:	Skin and eye contact are the primary routes of exposure but also exposure through inhalation or by accidental ingestion.
Acute Oral Toxicity:	Low toxicity: LD50 >5000 mg/kg, Rat.
Acute Dermal Toxicity:	Low toxicity: LD50 >2000 mg/kg, Rabbit.
Acute Inhalation Toxicity:	Harmful by inhalation: LC50 >1 - ≤ 5 mg/l/4 h, Rat.
Skin Corrosion/Irritation:	Irritating to skin.
Serious Eye Damage/Irritation:	Expected to be slightly irritating.
Respiratory Irritation:	ritation to the respiratory system.
Respiratory or Skin Sensitisation:	Not a skin sensitizer.
Aspiration Hazard:	Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Germ Cell Mutagenicity:	Positive in in-vitro, but negative in in-vivo mutagenicity assays.
Carcinogenicity:	Limited evidence of carcinogenic effect. Repeated skin contact has resulted in irritation and skin cancer in animals.
Reproductive and Developmental Toxicity:	Not expected to impair fertility. Not classified as a developmental toxicant.
Specific target organ toxicity - single exposure:	Not classified.
Specific target organ toxicity - repeated exposure:	May cause damage to organs through prolonged or repeated exposure. Blood. Thymus. Liver.

12. ECOLOGICAL INFORMATION

Basis for Assessment:	Information given is based on knowledge of the components and the ecotoxicology of similar products.
12.1 Acute Toxicity	
Acute Toxicity	Expected to be toxic: LL/EL/IL50 1-10 mg/l (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).
Fish	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Aquatic Invertebrates	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Algae	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Microorganisms	Expected to be practically non-toxic: LL/EL/IL50 > 100 mg/l
Chronic Toxicity	NOEC = No Observable Effect Concentration NOEL = No Observable Effect Level
Fish	NOEC/NOEL expected to be > 0.01 - ≤ 0.1 mg/l (based on modelled data)
Aquatic Invertebrates	NOEC/NOEL expected to be > 0.1 - ≤ 1.0 mg/l (based on modelled data)
12.2 Persistence and degradability:	Readily biodegradable in water.
12.3 Bioaccumulative Potential:	Contains constituents with the potential to bioaccumulate.
12.4 Mobility:	Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If product enters soil, one or more constituents will be mobile and may contaminate groundwater. Floats on water. Large volumes may penetrate soil and could contaminate groundwater.
12.5 Results of PBT and vPvB assessment:	The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB. PBT =Persistent, Bioaccumulative, Toxic. vPvB = very Persistent, very Bioaccumulative.
12.6 Other adverse effects:	Films formed on water may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Material Disposal:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification

	and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Container Disposal:	Send to drum recoverer or metal reclaimer. Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard if heated above the flash point. Do not puncture, cut or weld uncleaned drums. Do not pollute the soil, water or environment with the waste container. Comply with any local recovery or waste disposal regulations.
Local Legislation:	EU Waste Disposal Code (EWC): 13 07 01 Fuel oil and diesel 13 07 03 Other fuels (including mixtures) The number given to waste is associated with the appropriate usage. The user must decide if their particular use results in another waste code being assigned. Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

ADR/RID	**Land transport**
UN No:	1202
UN Proper Shipping Name:	FUEL OIL LIGHT , GAS OIL
Transport Hazard Class:	3
Packing group:	III
Danger label (primary risk):	3
Environmental Hazard:	Yes

ADN	**Inland waterways transport**
UN No:	1202
UN Proper Shipping Name:	FUEL OIL LIGHT , GAS OIL
Transport Hazard Class:	3
Packing group:	III
Danger label (primary risk):	3
Danger label (subsidiary risk)	N2, CMR, F
Environmental Hazard:	Yes

IMDG	**Sea transport**
UN No:	1202
UN Proper Shipping Name:	FUEL OIL LIGHT , GAS OIL
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	Yes

IATA	**Air transport**
UN No:	1202
UN Proper Shipping Name:	FUEL OIL LIGHT , GAS OIL
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	Yes

Sea (Annex II of MARPOL 73/78 and the IBC code)

Pollution Category	Not applicable.
Ship Type	Not applicable.
Product Name	Not applicable.
Special Precaution	Not applicable.

Additional Information: MARPOL Annex I rules apply for bulk shipments by sea.
MARPOL Annex II not applicable.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture	EU Regulation (EC) No 1907/2006 (REACH). EU Regulation (EC) No 1272/2008 Classification, labelling and packaging of chemical substances and mixtures (CLP).
15.2 Chemical Safety Assessment	A Chemical Safety Assessment was performed for this substance.

16. OTHER INFORMATION

CLP Hazard Statements:

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

CLP Precautionary statements:

P201: Obtain special instructions before use
P202: Do not handle until all safety precautions have been read and understood
P210: Keep away from heat/sparks/open flames/hot surfaces - No smoking
P233: Keep container tightly closed
P240: Ground/bond container and receiving equipment
P241: Use explosion-proof electrical/ventilation/ lightning equipment
P242: Use only non-sparing tools
P243: Take precautionary measures against static discharge
P261: Do not breath fume/gas/mist/vapours/spray
P260: Do not breathe dust/fume/gas/vapours/spray.
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area
P273: Avoid release to the environment
P280: Wear protective gloves/clothing/eye protection
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352: IF ON SKIN: Wash with plenty of soap and water
P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P308+P313: IF exposed or concerned: Get medical advice/attention
P312: Call a POISON CENTER or doctor/physician if you feel unwell
P330: Rinse mouth
P331: Do NOT induce vomiting
P332+P313: If skin irritation occurs: Get medical advice/attention
P362+P364: Take off contaminated clothing and wash before reuse
P370+P378: In case of fire: Use water spray or foam for extinction
P391: Collect spillage
P403+P233: Store in a well-ventilated place. Keep container tightly closed
P405: Store locked up
P501: Dispose of contents/container in accordance with local/regional/national/international regulation

Recommended Restrictions on Use (Advice Against):

This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier. This product is not to be used as a solvent or cleaning agent; for lighting or brightening fires; as a skin cleanser.

Additional Information:	This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.
Further Information	This product is intended for use in closed systems only.
MSDS Distribution:	The information in this document should be made available to all who may handle the product.
MSDS Version Number:	1.4
MSDS Effective Date:	17.03.2017
Disclaimer:	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.

Table of Contents exposure scenarios

Identified Uses according to the Use Descriptor System

Abbreviation:

SU 3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8- Manufacture of bulk, large scale chemicals (including petroleum products)
SU9 - Manufacture of fine chemicals
SU 10 - Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU 21 - Consumer uses: Private households (= general public = consumers)
SU 22 - Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

PC21 - Laboratory chemicals

PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure
PROC3 - Use in closed batch process (synthesis or formulation)
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15 - Use as laboratory reagent
PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected

ERC1 - Manufacture of substances
ERC2 - Formulation of preparations
ERC3 - Formulation in materials
ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
ERC5 - Industrial use resulting in inclusion into or onto a matrix
ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b - Industrial use of reactive processing aids
ERC6c - Industrial use of monomers for manufacture of thermo-plastics
ERC6d - Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7 - Industrial use of sub-stances in closed systems
ERC9a - Wide dispersive indoor use of substances in closed systems
ERC9b - Wide dispersive outdoor use of substances in closed systems

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	1. Manufacture of substance - Industrial
Use Descriptor	**Sector of Use**: SU3, SU8, SU9 **Process Categories**: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC 8b, PROC15 **Environmental Release Categories**: ERC 1, ERC4, ESVOC SpERC 1.1.v1
Scope of process	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.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Worker Exposure
Physical form of product	**Liquid, vapour pressure < 0.5 kPa at STP**
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), 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).	Wear suitable gloves tested to EN374 (nitrile).
Process sampling.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Bulk open loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with basic employee training.
Laboratory activities.	No other specific measures identified.
Bulk product storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	2.8E+07
Fraction of Regional tonnage used locally:	0.021
Annual site tonnage (tonnes/year):	6.0E+05
Maximum daily site tonnage (kg/day):	2.0E+06
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM (Risk Management Measures)):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
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 >= (%)	90.3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):	3.3E+06
Assumed domestic sewage treatment plant flow (m3/d)	10000
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated.	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
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).

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	2. Use as an intermediate - Industrial
Use Descriptor	**Sector of Use**: SU3, SU8, SU9 **Process Categories**: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 **Environmental Release Categories**: ERC6A, ESVOC SpERC 6.1a.v1
Scope of process	Use of substance as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Worker Exposure
Physical form of product	Liquid, vapour pressure > 0,5 kPa at STP
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), 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).	Wear suitable gloves tested to EN374 (nitrile).
Process sampling.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Bulk open loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with 'basic' employee training.
Laboratory activities.	No other specific measures identified.
Bulk product storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	3.5E+05
Fraction of Regional tonnage used locally:	0.043
Annual site tonnage (tonnes/year):	1.5E+04
Maximum daily site tonnage (kg/day):	5.0E+04
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-03
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary 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 >= (%)	51.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4.1E+05
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of substance is generated.	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of substance is generated.	

SECTION 3	EXPOSURE ESTIMATION
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method (HBM) has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
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).

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	3. Distribution of substance - Industrial
Use Descriptor	**Sector of Use**: SU3 **Process Categories**: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 **Environmental Release Categories**: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6A, ERC6B, ERC6C, ERC6D, ERC7, ESVOC SpERC 1.1b.v1
Scope of process	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.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Worker Exposure
Physical form of product	Liquid, vapour pressure > 0.5 kPa at STP
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), 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).	Wear suitable gloves tested to EN374 (nitrile).
Process sampling.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Bulk open loading and unloading.	Wear suitable gloves tested to EN374 (nitrile).
Drum and small package filling.	Wear suitable gloves tested to EN374 (nitrile).
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with 'basic' employee training.
Laboratory activities.	No other specific measures identified.
Storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	2.8E+07
Fraction of Regional tonnage used locally:	0.002
Annual site tonnage (tonnes/year):	5.6E+04
Maximum daily site tonnage (kg/day):	1.9E+05
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-06
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation).	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary 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 >= (%)	9.6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.9E+06
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	EXPOSURE ESTIMATION
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
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).

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	4. Formulation & (re)packing of substances and mixtures - Industrial
Use Descriptor	**Sector of Use**: SU3, SU10 **Process Categories**: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 **Environmental Release Categories**: ERC2, ESVOC SpERC 2.2.v1
Scope of process	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Worker Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure > 0.5 kPa at STP
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), 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).	Wear suitable gloves tested to EN374 (nitrile).
Process sampling.	No other specific measures identified.
Drum/batch transfers.	Use drum pumps or carefully pour from container. Wear suitable gloves tested to EN374 (nitrile) in combination with 'basic' employee training.
Bulk transfers.	Handle substance within a closed system. Wear suitable gloves tested to EN374 (nitrile).
Mixing operations (open systems)	Provide extract ventilation to points where emissions occur. Wear chemically resistant gloves (nitrile) in combination with 'basic' employee training.
Production or preparation or articles by tableting, compression, extrusion or pelletisation.	Wear suitable gloves tested to EN374 (nitrile).
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with 'basic' employee training.
Laboratory activities.	No other specific measures identified.
Storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	2.8E+07
Fraction of Regional tonnage used locally:	0.0011
Annual site tonnage (tonnes/year):	3.0E+04
Maximum daily site tonnage (kg/day):	1.0E+05
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (initial release prior to RMM (Risk Management Measures)):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
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 >= (%)	60.0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6.8E+05
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and Measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

Section 4.1 - Health

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

Section 4.2 -Environment

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

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).

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	5. Use as a fuel - Industrial
Use Descriptor	**Sector of Use**: SU3 **Process Categories**: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 **Environmental Release Categories**: ERC7, ESVOC SpERC 7.12a.v1
Scope of process	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	**Control of Worker Exposure**
Physical form of product	Liquid, vapour pressure > 0.5 kPa at STP
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	**Risk Management Measures**
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately.

	Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Drum/batch transfers.	Wear suitable gloves tested to EN374 (nitrile).
Bulk transfers.	Wear suitable gloves tested to EN374 (nitrile).
Use as a fuel (closed systems).	No other specific measures identified.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with basic employee training.
Storage.	Handle substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	4.5E+06
Fraction of Regional tonnage used locally:	0.34
Annual site tonnage (tonnes/year):	1.5E+06
Maximum daily site tonnage (kg/day):	5.0E+06
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from process (**after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):**	5.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
Onsite waste water 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 >= (%)	97.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	60.4
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils.	

Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.5E+06
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and Measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
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).

Exposure Scenario – Worker

SECTION 1	EXPOSURE SCENARIO TITLE
Title	6. Use as a fuel - Professional
Use Descriptor	**Sector of Use**: SU22 **Process Categories**: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16 **Environmental Release Categories**: ERC9A, ERC9B, ESVOC SpERC 9.12b.v1
Scope of process	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Worker Exposure
Physical form of product	Liquid, vapour pressure > 0.5 kPa at STP
Concentration of substance in product.	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 Operational Conditions affecting Exposure	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.

General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. . Wear gloves tested to EN374 (nitrile gloves have the best protection for WRD), if hand contact with substance is likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Drum/batch transfers.	Wear suitable gloves tested to EN374 (nitrile).
Bulk transfers.	Wear suitable gloves tested to EN374 (nitrile).
Refuelling.	Wear suitable gloves tested to EN374 (nitrile).
Use as a fuel (closed systems).	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour), or ensure operation is undertaken outdoors.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (nitrile) in combination with 'basic' employee training.
Storage.	Store substance within a closed system.

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	6.7E+06
Fraction of Regional tonnage used locally:	5.0E-04
Annual site tonnage (tonnes/year):	3.3E+03
Maximum daily site tonnage (kg/day):	9.2E+03
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from wide dispersive use (regional only):	1.0E-04
Release fraction to wastewater from wide dispersive use:	1.0E-05
Release fraction to soil from wide dispersive use (regional only):	1.0E-05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
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 >= (%)	8.3

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Organisational measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.4E+05
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and Measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

SECTION 3	**EXPOSURE ESTIMATION**
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

Section 3.2 - Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

SECTION 4	**GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO**
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Risk Management Measures are based on qualitative risk characterisation.	

Section 4.2 -Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
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).

Exposure Scenario – Consumer

SECTION 1	EXPOSURE SCENARIO TITLE
Title	7. Use as a fuel - Consumer
Use Descriptor	**Sector of Use**: SU21 **Process Categories**: PC21 **Environmental Release Categories**: ERC9A, ERC9B, ESVOC SpERC 9.12b.v1
Scope of process	Covers consumer uses in liquid fuels.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1	Control of Consumer Exposure
Product Characteristics	
Physical form of product	Liquid, vapour pressure > 10 Pa
Concentration of substance in product.	Unless otherwise stated: Covers concentrations up to 100 %
Amounts Used	
Unless otherwise stated:	
for each use event, covers amount up to (g):	37500
covers skin contact area (cm2):	420
Frequency and duration of use	
Unless otherwise stated:	
covers use up to (times/day of use):	0.143
covers use up to (hours/events):	2

Product Categories	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
Fuels. Liquid: Automotive Refuelling.	Covers concentration up to 100 %
	Covers use up to 52 day/year
	Covers use up to 1 times/day of use
	Covers skin contact area 210 cm2
	For each use event, covers amount up to 37500 g.
	Covers outdoor use.
	Covers use in room size of 100 m3
	Covers exposure up to 0.05 hours/event
Fuels. Liquid Garden Equipment - Use.	Covers concentration up to (%): 100 %
	Covers use up to 26 day/year

	Covers use up to 1 times/day of use
	For each use event, covers amount up to 750 g.
	Covers outdoor use.
	Covers use in room size of 100 m3
	Covers exposure up to 2.00 hours/event
Fuels. Liquid: Garden Equipment - Refuelling.	Covers concentrations up to 100 %
	Covers use up to 26 day/year
	Covers use up to 1 times/day of use
	Covers skin contact area 420 cm2
	For each use event, covers amount up to 750 g.
	Covers use in a one car garage (34 m3) under typical ventilation.
	Covers use in room size of 34 m3
	Covers exposure up to 0.03 hours/event

Section 2.2	**Control of Environmental Exposure**
Substance is complex UVCB.	
Predominantly hydrophobic.	
Amounts Used	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.6E+07
Fraction of Regional tonnage used locally:	5.0E-04
Annual site tonnage (tonnes/year):	8.2E+03
Maximum daily site tonnage (kg/day):	2.3E+04
Frequency and Duration of Use	
Continuous release.	
Emission Days (days/year):	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other Operational Conditions affecting Environmental Exposure	
Release fraction to air from wide dispersive use (regional only):	1.0E-04
Release fraction to wastewater from wide dispersive use:	1.0E-05
Release fraction to soil from wide dispersive use (regional only):	1.0E-05
Conditions and Measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3.5E+05
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and Measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
Conditions and measures related to external recovery of waste	

External recovery and recycling of waste should comply with applicable local and/or regional regulations.

SECTION 3	EXPOSURE ESTIMATION
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
Section 3.2 - Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 4.1 - Health	
Predicted exposures are not expected to exceed the DN(M)EL (Derived Minimum Effect Levels) 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.	

Section 4.2 -Environment
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).