Safety Data Sheet

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

1.1 Product Identifier

Material Name:	**Kerosine (petroleum) CAS 8008-20-6**
REACH Registration No.:	01-2119485517-27
Synonyms:	Jet A1, jet fuel, kerosine

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

Product Use: Fuel adapted to aircraft.
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 331231

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
Specific target organ toxicity - single exposure, Category 3; Narcotic effects.	H336
Chronic hazards to the aquatic environment, Category 2	H411

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.
H336: May cause drowsiness or dizziness.

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

CLP Precautionary statements:

General:
P102

PREVENTION:
P210, P233, P240, P241, P242, P243, P261, P264, P271, P273, P280

RESPONSE:

P301+P310, P302+P352, P303+P361+P353, P304+P340, P312, P331, P332+P313, P362+P364, P391

STORAGE:
P403+P235, P403+P233, P405

DISPOSAL:
P501

2.3 Other Hazards

Health Hazards: Slightly irritating to respiratory system.

Safety Hazards: Liquid evaporates quickly and can ignite leading to a flash fire, or an explosion in a confined space. Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range. Electrostatic charges may be generated during handling. Electrostatic discharge may cause fire. May ignite on surfaces at temperatures above auto-ignition temperature.

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

CAS No.: 8008-20-6

3.2 Mixtures

Preparation Description: Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C16 range.

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.
Kerosine	8008-20-6	232-366-4	01-2119485517-27	100

Chemical Name	Hazard Class & Category	Hazard Statement
Kerosine	Flam. Gas, 1; Press. Gas, Liq. Gas; Flam. Liq., 3; Skin Corr., 2; Asp. Tox., 1; STOT SE, 3; Aquatic Chronic, 2	H226; H304; H315; H336; 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 eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persists, transport to the nearest medical facility for additional treatment.

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 38.3°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. Skin

irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

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.

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. Will float and can be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible.

5.3 Advice for fire-fighters: Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

Additional Advice: Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately.

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: May ignite on surfaces at temperatures above auto-ignition temperature. Do not breathe fumes, vapour. Do not operate electrical equipment. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Attempt to disperse the gas 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. Monitor area with combustible gas meter.

6.2 Environmental Precautions: Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.

6.3 Methods and Material for Containment and Clean Up: For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate 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: Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Avoid inhaling vapour and/or mists. Never siphon by mouth. Avoid contact with the skin. When using do not eat or drink. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Earth all equipment. Electrostatic charges may be generated during handling. Electrostatic discharge may cause fire.

7.2 Conditions for safe storage, including any incompatibilities: Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Take suitable precautions when opening sealed containers, as pressure can build up during storage. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Vapours from tanks should not be released to atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system.

7.3 Specific End Uses: Please refer to Ch16 and/or the annexes for the registered uses under REACH.

Additional Information: Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication "COSHH Essentials".
Ensure that all local regulations regarding handling and storage facilities are followed.

Product Transfer: Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.

Recommended Materials: For containers, or container linings use carbon steel and low alloy steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. For container linings the following may also be used: Unplastisized polyvinyl chloride (U-PVC), Fluoropolymers (PTFE), Polyvinylidenefluoride (PVDF), Polyetheretherketone (PEEK), Polyamide (PA-11). For seals and gaskets use: Fluoroelastomer (FKM), Viton A, and Viton B, Nitrile butadiene (NBR), Buna-N. For coating (paint) materials use: High build, amine adduct-cured epoxy.

Unsuitable Materials: For containers or container linings, examples of materials to avoid are: Polyethylene (PE, HDPE), Polypropylene (PP), Polymethyl methacrylate (PMMA), Acrylonnitrile butadiene styrene (ABS). For seals and gaskets, examples of materials to avoid are: Natural rubber (NR), Ethylene Propylene (EPDM, Polychloroprene (CR) - Neoprene, Butyl (IIR), Chlorosulphonated polyethylene (CSM), e.g. Hypalon.

Container Advice: Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only. TWA = time-weighted average.

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

8.1 Control Parameters

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Kerosine	ACGIH	TWA [Non-aerosol.]		200 mg/m3	P: Application restricted to conditions in which there are negligible aerosol exposures. As total hydrocarbon vapor.
	ACGIH	SKIN_DES [Non-aerosol.]	750 ppm	1,810 mg/m^3	Can be absorbed through the skin. As total hydrocarbon vapor.

Derived No Effect Levels (DNEL) No DNEL value has been established.

PNEC 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). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable (breakthrough time of > 240 minutes). For incidental contact/splash protection Neoprene, PVC gloves may be suitable.

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. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations. Select a filter suitable for combined particulate/organic gases and vapours (boiling point >65 °C) meeting EN14387.
Thermal Hazards:	Not applicable.
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 Controls	
Environmental exposure control measures:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Consumer Exposure Controls	
Exposure Control Measures for Consumers:	Do not ingest. If swallowed then seek immediate medical assistance.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	Pale yellow. Straw. Colourless. Liquid
Odour:	Hydrocarbon.
Odour threshold:	-
pH:	Not applicable
Melting point/freezing point:	<-47 °C
Initial boiling point and boiling range:	150 - 300 °C
Flash point:	> 38 °C
Evaporation rate:	-
Flammability (solid, gas)	-
Upper/lower flammability or explosive limits:	1-6 % (V)
Vapour pressure, at 37,8 °C:	< 1 kPa
Vapour density:	-
Relative density:	0,775 – 0,840 g/cm3
Solubility(ies):	Not solubility
Partition coefficient: n-octanol/water:	-
Auto-ignition temperature:	>250 °C

Decomposition temperature:	-
Kinematics Viscosity	<= 8 mm2/s vid -20 oC
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:	Oxidises on contact with air.
10.2 Chemical Stability:	Stable under normal conditions of use.
10.3 Possibility of Hazardous Reactions:	Oxidises on contact with air.
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, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological effects

Basis for Assessment:	Information given is based on product data, a knowledge of the components and the toxicology of similar products.
Likely Routes of Exposure:	Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and 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:	Low toxicity: LC50 >5 mg/l / 4 h, Rat
Skin Corrosion/Irritation:	Irritating to skin.
Serious Eye Damage/	

Irritation:	Expected to be slightly irritating.
Respiratory Irritation:	Inhalation of vapours or mists may cause irritation 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:	Not considered a mutagenic hazard.
Carcinogenicity:	Not classified as a carcinogen. 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:	High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Specific target organ toxicity - repeated exposure:	Kidney: caused kidney effects in male rats which are not considered relevant to humans

12. ECOLOGICAL INFORMATION

Basis for Assessment:	Information given is based on a knowledge of the components and the ecotoxicology of similar products.
12.1 Toxicity	
Acute Toxicity:	Toxic: LL/EL/IL50 > 1 <= 10 mg/l (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).
Fish:	Toxic: LL/EL/IL50 > 1 <= 10 mg/l
Aquatic Invertebrates:	Toxic: LL/EL/IL50 > 1 <= 10 mg/l
Algae:	Toxic: LL/EL/IL50 > 1 <= 10 mg/l
Microorganisms:	Practically nontoxic: LL/EL/IL50 > 100 mg/l
Chronic Toxicity 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 test data)
12.2 Persistence and Degradability:	Expected to be inherently biodegradable. The volatile constituents will oxidize rapidly by photochemical reactions in air.
12.3 Bioaccumulative Potential:	Contains constituents with the potential to bioaccumulate.
12.4 Mobility:	Floats on water. Contains volatile constituents. Evaporates within a day from water or soil surfaces. Large volumes may penetrate soil and could contaminate groundwater.

12.5 Result of the 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.
12.6 Other Adverse Effects:	Films formed on water may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

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 03 wastes of liquid fuels, 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.:	1223
Proper Shipping Name:	KEROSINE
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	No Environmentally Hazardous

ADN	**Water transport, inland**
UN No.:	1223
Proper Shipping Name:	KEROSINE
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	Ja

IMDG	**Water transport, sea**
UN No.:	1223
Proper Shipping Name:	KEROSINE. Marine pollutant.
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	Yes, environmentally hazardous

IATA-DGR	**Air transport**
UN No.:	1223
Proper Shipping Name:	KEROSINE
Transport Hazard Class:	3
Packing group:	III
Environmental Hazard:	Yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:	Not applicable
Additional information:	MARPOL Annex I rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

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

15.1 Safety, health and	EU Regulation (EC) No 1907/2006 (REACH).

environmental regulations/legislation specific for the substance or mixture	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 vapor.
H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H336: May cause drowsiness or dizziness.
H411: Toxic to aquatic life with long lasting effects.

CLP Precautionary statements

P102: Keep out of reach of children.
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: Avoid breathing fume/vapours/spray
P264: Wash hands thoroughly after handling
P271: Use only ioutdoors or in a well-ventiladed 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
P312: Call a POISON CENTER or doctor/physician if you feel unwell
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.
P391: Collect spillage
P403+P233: Store in a well-ventilated place. Keep container tightly closed

	P403+P235: Store in a well-ventilated place. Keep cool 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:	1.1
MSDS Effective Date:	28.09.2015
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

Uses – Worker
Title
1. Manufacture of substance
   - Industrial

Uses – Worker
Title
2. Use as an intermediate
   - Industrial

Uses – Worker
Title
3. Distribution of substance
   - Industrial

Uses – Worker
Title
4. Formulation & (re)packing of substances and mixtures
   - Industrial

Uses – Worker
Title
5. Use as a fuel
   - Industrial

Uses – Worker
Title
6. Use as a fuel
   - Professional

Use – Consumer
Title
7. Use as a fuel
   - Consumer

Abbreviation:

SU3 - 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)
SU21 - Consumer uses: Private households (= general public = consumers)
SU22 - Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

PC13 - Fuels

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:** SU 3, SU8, SU9 **Process Categories:** PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 **Environmental Release Categories:** ERC 1, ERC 4, 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
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 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 Measure
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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	No other specific measures identified.
Bulk transfers.	No other specific measures identified.
Process sampling.	No other specific measures identified.
Laboratory activities.	No other specific measures identified.

Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified.
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):	5.4E+06
Fraction of Regional tonnage used locally:	0.11
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):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-04
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.	
Onsite waste water 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 [3] (%	97.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	56.1
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 (%)	94.7

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)	2.0E+06
Assumed domestic sewage treatment plant flow (m3/d)	10 000
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.	

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:** SU 3, SU8, SU9 **Process Categories:** PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 **Environmental Release Categories:** ERC 6A, 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
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 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 (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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified
General exposures (open systems).	No other specific measures identified.
Bulk transfers.	No other specific measures identified.
Process sampling.	No other specific measures identified.

Laboratory activities.	No other specific measures identified.
Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified
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):	1.8E+05
Fraction of Regional tonnage used locally:	8.3E-02
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-04
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 [3] (%)	81.4
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 (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.8E+05

Assumed domestic sewage treatment plant flow (m3/d)	2 000
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 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.	

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**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15 **Environmental Release Categories**: ERC 1, ERC 2, ERC 3, ERC 4, ERC 5, ERC 6A, ERC 6B, ERC 6C, ERC 6D, ERC 7, 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
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 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 (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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	No other specific measures identified.
Process sampling.	No other specific measures identified.
Laboratory activities.	No other specific measures identified.
Bulk transfers.	No other specific measures identified.

Drum and small package filling.	No other specific measures identified
Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified.

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):	5.4E+06
Fraction of Regional tonnage used locally:	2.0E-03
Annual site tonnage (tonnes/year):	1.1E+04
Maximum daily site tonnage (kg/day):	3.6E+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):	1.0E-05
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 freshwater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of [3] (%)	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 (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.6E+06

Assumed domestic sewage treatment plant flow (m3/d)	2 000
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	

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**: SU 3, SU 10 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 **Environmental Release Categories**: ERC 2, 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 - 10 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 (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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	No other specific measures identified.
Process sampling.	No other specific measures identified.
Laboratory activities.	No other specific measures identified.

Bulk transfers.	No other specific measures identified.
Mixing operations (open systems).	No other specific measures identified.
Manual. Transfer from/pouring from containers.	No other specific measures identified.
Drum/batch transfers.	No other specific measures identified.
Production or preparation or articles by tableting, compression, extrusion or pelletisation.	No other specific measures identified.
Drum and small package filling.	No other specific measures identified.
Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified.

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):	5.2E+06
Fraction of Regional tonnage used locally:	5.8E-03
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 (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
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 [3] (%)	86.0

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 (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.6E+05
Assumed domestic sewage treatment plant flow (m3/d)	2 000
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.	

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**: SU 3 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 **Environmental Release Categories**: ERC 7, 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
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 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 (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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
Use as a fuel (closed systems).	No other specific measures identified.
Bulk transfers.	No other specific measures identified.
Drum/batch transfers.	No other specific measures identified.
Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified.

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):	5.5E+05
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	5.5E+05
Maximum daily site tonnage (kg/day):	1.8E+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):	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.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of [3] (%)	84.6
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 (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.3E+06
Assumed domestic sewage treatment plant flow (m3/d)	2 000
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
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 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.	

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**: SU 22 **Process Categories**: PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 **Environmental Release Categories**: ERC 9A, ERC 9B, 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
Product Characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 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 (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 kerosine), if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
Use as a fuel (closed systems).	No other specific measures identified.
Bulk transfers.	No other specific measures identified.
Transfer from/pouring from containers.	No other specific measures identified.

Equipment cleaning and maintenance.	No other specific measures identified.
Bulk product storage.	No other specific measures identified.
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):	4.4E+06
Fraction of Regional tonnage used locally:	5.0E-04
Annual site tonnage (tonnes/year):	2.2E+03
Maximum daily site tonnage (kg/day):	6.1E+03
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-03
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.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of [3] (%)	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 (%)	94.7
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6.9E+05
Assumed domestic sewage treatment plant flow (m3/d)	2 000
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
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 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.	

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**: SU 21 **Product Categories**: PC13 **Environmental Release Categories**: ERC 9A, ERC 9B, ESVOC SpERC 9.12c.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):		50,000
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/event):		2
Other Operational Conditions affecting Exposure		
Unless otherwise stated:		
Covers use at ambient temperatures.		
Covers use in room size of 20 m3.		
Covers use under typical household ventilation.		

Product Categories	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
Fuels. Liquid: Automotive Refuelling.	Covers concentrations up to 100 %
	Covers use up to 52 day/year
	Covers use up to 1 times/day of use
	Covers skin contact area 210.00 cm2
	For each use event, covers amount up to 50,000 g.
	Covers outdoor use.

	Covers use in room size of 100 m3
	Covers exposure up to 0.05 hours/event
Fuels. Liquid: Home space heater fuel.	Covers concentrations up to 100 %
	Covers use up to 365 day/year
	Covers use up to 1 times/day of use
	Covers skin contact area 210.00 cm2
	For each use event, covers amount up to 1,500 g.
	Covers use under typical household ventilation.
	Covers use in room size of 20 m3
	Covers exposure up to 0.03 hours/event
Fuels. Liquid Garden Equipment - Use.	Covers concentrations 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 1,000 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 420.00 cm2
	For each use event, covers amount up to 1,000 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):	1.8E+05
Fraction of Regional tonnage used locally:	5.0E-04
Annual site tonnage (tonnes/year):	89
Maximum daily site tonnage (kg/day):	245
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-03
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	
Risk from environmental exposure is driven by freshwater.	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3.1E+04
Assumed domestic sewage treatment plant flow (m3/d)	2 000
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	
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 consumer 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 applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

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