SAFETY DATA SHEET
According to EC No 1907/2006 as amended as at the date of this SDS

ATB/VTB Bottoms

Version	Revision Date:	SDS Number:	Date of last issue: 14.07.2023
1.5	15.10.2024	800001008367	Print Date 22.10.2024

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

1.1 Product identifier

Trade name	:	ATB/VTB Bottoms
Product code	:	X2256
Unique Formula Identifier (UFI)	:	PV3P-6RJR-250V-1PYN

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

Use of the Substance/Mixture	:	Base chemical., Raw material for use in the chemical industry. Please refer to section 16 and/or the annexes for the registered uses under REACH. For R & D use only.
Uses advised against	:	This product must not be used in applications other than those listed in Section 1 without first seeking the advice of the supplier.

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier	:	**Shell Chemicals Europe B.V.** PO Box 2334 3000 CH Rotterdam Netherlands
Telephone	:	+31 (0)10 441 5137 / +31 (0)10 441 5191
Telefax	:	+31 (0)20 716 8316 / +31 (0)20 713 9230
Contact for Safety Data Sheet	:	sccmsds@shell.com

1.4 Emergency telephone number

+44 (0) 1235 239 670
National Poison Information Centre (NVIC): Tel. nr. +31(0)88 755 8000 (24 hrs a day and 7 days a week).
Only for the purpose of informing medical personnel.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4, Inhalation	H332: Harmful if inhaled.

Carcinogenicity, Category 1B	H350: May cause cancer.
Reproductive toxicity, Category 2	H361: Suspected of damaging fertility or the unborn child.
Specific target organ toxicity - repeated exposure, Category 2, Blood , Liver , thymus	H373: May cause damage to organs through prolonged or repeated exposure.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 1	H410: Very toxic to aquatic life with long lasting effects.
Supplemental Hazard Statements	EUH066: Repeated exposure may cause skin dryness or cracking.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:
Not classified as a physical hazard according to CLP criteria.

HEALTH HAZARDS:
H332 Harmful if inhaled.
H350 May cause cancer.
H361 Suspected of damaging fertility or the unborn child.
H373 May cause damage to organs (Blood, Liver, thymus) through prolonged or repeated exposure.

ENVIRONMENTAL HAZARDS:
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

Supplemental Hazard Statements : EUH066 Repeated exposure may cause skin dryness or cracking.

Precautionary statements :

Prevention:

P201 Obtain special instructions before use.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Storage:

No precautionary phrases.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Hydrogen sulphide (H2S), an extremely flammable and toxic gas, and other hazardous vapours may evolve and collect in the headspace of storage tanks, transport vessels and other enclosed containers.
May dull the sense of smell, so do not rely on odour as an indication of hazard.
May ignite on surfaces at temperatures above auto-ignition temperature.
This material is a static accumulator.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.
Contact with hot material can cause thermal burns which may result in permanent skin damage.
Not classified as flammable but will burn.
Flammable vapours may be present even at temperatures below the flash point.
Therefore it should be treated as a potentially flammable liquid.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Gas oils (petroleum), heavy vacuum	64741-57-7 265-058-3 649-009-00-7 01-2119487294-29	Carc. 1B; H350 Acute Tox. 4; H332 Repr. 2; H361 STOT RE 2; H373	0 - < 100

		Aquatic Acute 1; H400 Aquatic Chronic 1; H410 M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 1	
residues (petroleum),atm.tower	64741-45-3 265-045-2 649-008-00-1 01-2119485975-17	Carc. 1B; H350 Acute Tox. 4; H332 Repr. 2; H361 STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 EUH066 M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 1	0 - < 100
Residues (Petroleum), Vacuum	64741-56-6 265-057-8 01-2119498291-32		0 - < 100
fuel, diesel no. 2	68476-34-6 270-676-1 649-227-00-2	Flam. Liq. 3; H226 Acute Tox. 4; H332 Asp. Tox. 1; H304 Skin Irrit. 2; H315 Carc. 1B; H350 STOT RE 2; H373 Aquatic Chronic 2; H411	10 - 15

Remarks : Contains hydrogen sulphide, CAS # 7783-06-4.

Residues and their blends with distillates can be used as heavy fuel oils and need to be heated for use.

For explanation of abbreviations see section 16.

Further information

Contains:

Chemical name	Identification number	Classification	Concentration (% w/w)
Hydrogen sulfide	7783-06-4, 231-977-3	Flam. Gas1A; H220 Press. GasLique-	0,04

		fied gas; H280 Acute Tox.2; H330 Eye Irrit.2; H319 Aquatic Acute1; H400	

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Vapourisation of H2S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from the victim to rescuer. Mechanical ventilation should be used to resuscitate if at all possible.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

If inhaled : Call emergency number for your location / facility.
Remove to fresh air.
Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardiopulmonary Resuscitation (CPR) as required and transport to the nearest medical facility.
Casualties suffering ill effects as a result of exposure to hydrogen sulphide should be removed to fresh air.
If inhalation of mists, fumes or vapour causes irritation to the nose or throat, remove to fresh air.

In case of skin contact : Cold product -
Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
If persistent irritation occurs, obtain medical attention.

Hot product -
If contact with hot product, immediately cool the burn area by flushing with large amounts of water for at least 15 minutes.
Do not attempt to remove anything from the burn area.
Do not apply burn creams or ointments.
Cover the burn area loosely with a sterile dressing, if available.
Transport to the nearest medical facility for additional treatment.
All burns should receive medical attention.

In case of eye contact	:	Cold product - Flush eye with copious quantities of water. Remove contact lenses, if present and easy to do. Continue rinsing. If persistent irritation occurs, obtain medical attention. Hot product - If contact with hot product, immediately cool the burn area by flushing with large amounts of water. Do not attempt to remove anything from the burn area. Do not apply burn creams or ointments. Remove contact lenses, if present and easy to do. Continue rinsing. Cover the burn area loosely with a sterile dressing, if available. Transport to the nearest medical facility for additional treatment. All burns should receive medical attention.
If swallowed	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms	:	Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Skin irritation signs and symptoms may include a burning sensation, redness, or swelling. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Hot product - Contact with the skin can cause severe burns, redness, swelling, blisters and/or tissue damage. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Hot product - Contact with the eye can cause severe burns, redness, swelling, blurred vision, and may result in permanent loss of vision. Ingestion may result in nausea, vomiting and/or diarrhoea. Liver damage may be indicated by loss of appetite, jaundice (yellowish skin and eye colour), fatigue, bleeding or easy bruising and sometimes pain and swelling in the upper right abdomen.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT! Call a doctor or poison control center for guidance. Treat symptomatically. Hydrogen sulphide (H2S) - CNS asphyxiant. May cause rhinitis, bronchitis and occasionally pulmonary oedema after severe exposure. CONSIDER: Oxygen therapy. Consult a Poi-

son Control Center for guidance.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable 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 direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting	:	Hydrogen sulphide (H2S) and toxic sulphur oxides may be given off when this material is heated. Do not depend on sense of smell for warning. Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Oxides of nitrogen Oxides of sulphur. Unidentified organic and inorganic compounds. 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. Will float and can be reignited on surface water. Carbon monoxide may be evolved if incomplete combustion occurs.

5.3 Advice for firefighters

Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
Specific extinguishing methods	:	Use water spray to cool unopened containers.
Further information	:	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. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : 6.1.1 For non emergency personnel:
Do not breathe fumes, vapour.
Do not operate electrical equipment.
6.1.2 For emergency responders:
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.
May ignite on surfaces at temperatures above auto-ignition temperature.

6.2 Environmental precautions

Environmental precautions : Take measures to minimise the effects on groundwater.
Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.
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 cleaning up

Methods for cleaning up : Take precautionary measures against static discharges.
For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, 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
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.

6.4 Reference to other sections

For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet., Notify authorities if any exposure to the general public or the environment occurs or is likely to occur., For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet., 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.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this 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.
Prevent spillages.
Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse.
Ensure that all local regulations regarding handling and storage facilities are followed.

Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin.

Advice on safe handling : The inherent toxic and olfactory (sense of smell) fatiguing properties of hydrogen sulphide require that air monitoring alarms be used if concentrations are expected to reach harmful levels such as in enclosed spaces, heated transport vessels and spill or leak situations. If the air concentration exceeds 10 ppm, the area should be evacuated unless respiratory protection is in use.
Ensure that all local regulations regarding handling and storage facilities are followed.
Avoid prolonged or repeated contact with skin.
When using do not eat or drink.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
Earth all equipment.
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges.
These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements.
These activities may lead to static discharge e.g. spark for-

mation.
Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling.
Do NOT use compressed air for filling, discharging, or handling operations.

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. Refer to guidance under Handling section.

Hygiene measures : Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

7.2 Conditions for safe storage, including any incompatibilities

Further information on storage stability : Drum and small container storage:
Drums should be stacked to a maximum of 3 high.
Use properly labeled and closable containers.
Prevent ingress of water.
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.
Tanks should be fitted with heating coils.
Ensure heating coils are always covered with product (minimum 15 cm).
Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.
Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Packaging material	:	Suitable material: For containers, or container linings use mild steel, stainless steel., Aluminium may also be used for applications where it does not present an unnecessary fire hazard., Examples of suitable materials are: high density polyethylene (HDPE) and Viton (FKM), which have been specifically tested for compatibility with this product., For container linings, use amine-adduct cured epoxy paint., For seals and gaskets use: graphite, PTFE, Viton A, Viton B. Unsuitable material: Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene., However, some may be suitable for glove materials.
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.

7.3 Specific end use(s)

Specific use(s)	:	Please refer to section 16 and/or the annexes for the registered uses under REACH. See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity). IEC/TS 60079-32-1: Electrostatic hazards, guidance Consult the technical guidelines for the use of this substance/mixture.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no components with occupational exposure limit values.

Biological occupational exposure limits

No biological limit allocated.

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Gas oils (petroleum), heavy vacuum	Workers	Dermal	Long-term systemic effects	0,065 mg/kg 8h
Gas oils (petroleum), heavy vacuum	Workers	Inhalation	Long-term systemic effects	0,12 mg/m3/8h (aerosol)

residues (petroleum),atm.tower	Workers	Dermal	Long-term systemic effects	0,065 mg/kg 8h
residues (petroleum),atm.tower	Workers	Inhalation	Long-term systemic effects	0,12 mg/m3/8h (aerosol)
Residues (Petroleum), Vacuum	Workers	Inhalation	Long-term local effects	2,88 mg/m3
Residues (Petroleum), Vacuum	Consumers	Inhalation	Long-term local effects	0,61 mg/m3

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Remarks:	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

Engineering measures

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.
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.
Firewater monitors and deluge systems are recommended.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Eye washes and showers for emergency use.

General Information:
Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
Do not ingest. If swallowed, then seek immediate medical assistance.

Personal protective equipment

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

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.

Eye protection : If material is handled such that it could be splashed into eyes,

protective eyewear is recommended.
Wear safety glasses and face shield (preferably with a chin guard) if splashes are likely to occur.
If a local risk assessment deems it so then chemical splash goggles may not be required and safety glasses may provide adequate eye protection.

Approved to EU Standard EN166.

Hand protection

Remarks	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. 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. When handling heated product wear heat resistant gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. 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. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model.
Skin and body protection	:	Wear chemical and heat resistant gloves and boots. Where risk of splashing, also wear an apron.
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.

Select a filter suitable for organic gases and vapours [Type A boiling point > 65°C (149°F)] meeting EN14387.

In areas where hydrogen sulphide vapours may accumulate, a positive-pressure air-supplied respirator is advised.

Thermal hazards : When handling heated product, wear heat resistant gloves, safety hat with chin strap, face shield (preferably with a chin guard), safety glasses, heat resistant coveralls (with cuffs over gloves and legs over boots), neck protection and heavy duty boots, e.g. leather for heat resistance.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : Green-black oil to black, viscous semi-solid.

Colour : Brown to black

Odour : Odour varies; may range from strong hydrocarbon to rotten egg odour.

Odour Threshold : Data not available

Melting point/freezing point : Data not available

Initial boiling point and boiling range : Data not available

Flammability

Flammability (solid, gas) : Not applicable

Flammability (liquids) : Does not sustain combustion.

Lower explosion limit and upper explosion limit / flammability limit

Upper explosion limit / upper flammability limit : Typical 5 %(V)

no data available

Lower explosion limit / Lower flammability limit : Typical 0,5 %(V)

		no data available
Flash point	:	90 °C
Auto-ignition temperature	:	> 250 °C
		Data not available
Decomposition temperature		
Decomposition temperature	:	no data available
pH	:	Not applicable
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	1220 mm2/s Method: ASTM D445
Solubility(ies)		
Water solubility	:	0,05 g/l negligible
Partition coefficient: n-octanol/water	:	log Pow: ca. 2 - 20
		Data not available
Vapour pressure	:	Data not available (50 °C)
Relative density	:	0,9 - 0,94 Method: ASTM D4052
Density	:	0,9554 g/cm3 Method: ASTM D4052
Relative vapour density	:	Data not available
Particle characteristics		
Particle size	:	Data not available

9.2 Other information

Explosive properties	:	Classification Code: Not classified.
Oxidizing properties	:	Data not available
		Not applicable
Flammability (liquids)	:	Does not sustain combustion.
Evaporation rate	:	Data not available

Conductivity	:	Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid
Surface tension	:	Data not available
Molecular weight	:	Data not available

SECTION 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

Hazardous reactions	:	No hazardous reaction is expected when handled and stored according to provisions

10.4 Conditions to avoid

Conditions to avoid	:	Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity.

10.5 Incompatible materials

Materials to avoid	:	Strong oxidising agents.

10.6 Hazardous decomposition products

Hydrogen sulphide.
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.

SECTION 11: Toxicological information

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

Information on likely routes of exposure : Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.

Acute toxicity

Product:

Acute oral toxicity : LD50 Oral (Rat): > 5.000 mg/kg
Remarks: Low toxicity

Acute inhalation toxicity : LC 50 (Rat): >1 - <=5 mg/l
Exposure time: 4 h
Remarks: Harmful if inhaled.

Acute dermal toxicity : LD 50 (Rabbit): > 2.000 mg/kg
Remarks: Low toxicity

Components:

residues (petroleum),atm.tower:

Acute oral toxicity : Remarks: Based on available data, the classification criteria are not met.

Acute inhalation toxicity : LC 50 (Rat, male and female): 4,1 - 4,5 mg/l
Exposure time: 4 h
Method: Test(s) equivalent or similar to OECD Test Guideline 403
Remarks: Harmful if inhaled.

Acute dermal toxicity : Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Product:

Remarks : Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
Contact with hot material can cause thermal burns which may result in permanent skin damage.
Slightly irritating to skin.
Based on available data, the classification criteria are not met.

Components:

residues (petroleum),atm.tower:

Remarks : Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation

Product:

Remarks : Irritating to eyes. (Hydrogen Sulfide)
Hot product may cause severe eye burns and/or blindness.

Components:

residues (petroleum),atm.tower:

Remarks : Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Product:

Remarks : Not a sensitiser.
Based on available data, the classification criteria are not met.

Components:

residues (petroleum),atm.tower:

Remarks : Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Product:

Genotoxicity in vivo : Remarks: Positive in in-vitro, but negative in in-vivo mutagenicity assays.

Germ cell mutagenicity- Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Components:

residues (petroleum),atm.tower:

Genotoxicity in vitro : Remarks: Based on available data, the classification criteria are not met.

Genotoxicity in vivo : Remarks: Based on available data, the classification criteria are not met.

Carcinogenicity

Product:

Remarks : Causes cancer in laboratory animals.

Carcinogenicity - Assessment : Category 1B

Components:

residues (petroleum),atm.tower:

Species : Mouse
Application Route : Dermal
Method : Test(s) equivalent or similar to OECD Test Guideline 451
Remarks : May cause cancer.

Material	GHS/CLP Carcinogenicity Classification
Gas oils (petroleum), heavy vacuum	Carcinogenicity Category 1B
residues (petroleum),atm.tower	Carcinogenicity Category 1B
Residues (Petroleum), Vacuum	No carcinogenicity classification.
fuel, diesel no. 2	Carcinogenicity Category 1B

Material	Other Carcinogenicity Classification
Residues (Petroleum), Vacuum	IARC: Group 2B: Possibly carcinogenic to humans
fuel, diesel no. 2	IARC: Group 3: Not classifiable as to its carcinogenicity to humans

IARC	
Residues (Petroleum), Vacuum	Occupational exposures to hard bitumens and their emissions during mastic asphalt work are 'possibly carcinogenic to humans' (IARC Group 2B). Occupational exposures to straight-run bitumens and their fume condensates during road paving are 'possibly carcinogenic to humans' (IARC Group 2B).

Reproductive toxicity

Product:

Effects on fertility :

Remarks: Causes foetotoxicity at doses which are maternally toxic.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Components:

residues (petroleum),atm.tower:

Effects on fertility : Species: Rat

Method: Test(s) equivalent or similar to OECD Test Guideline 414
Remarks: Based on data from similar materials, Suspected of damaging fertility or the unborn child.

STOT - single exposure

Product:

Remarks : Inhalation of vapours or mists cause irritation to the respiratory system. (Hydrogen Sulfide)
Contains hydrogen sulphide.

Components:

residues (petroleum),atm.tower:

Remarks : Based on available data, the classification criteria are not met.

STOT - repeated exposure

Product:

Remarks : Causes damage to organs through prolonged or repeated exposure.

Target Organs : Blood, Liver, thymus

Components:

residues (petroleum),atm.tower:

Exposure routes : Skin contact
Remarks : May cause damage to organs or organ systems through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Gas oils (petroleum), heavy vacuum:

Species : Rat
Application Route : Skin contact
Exposure time : 90 d
Method : Test(s) equivalent or similar to OECD Test Guideline 411
Remarks : Based on data from similar materials

residues (petroleum),atm.tower:

Species	:	Rat
Application Route	:	Skin contact
Exposure time	:	90 d
Method	:	Test(s) equivalent or similar to OECD Test Guideline 411
Remarks	:	Based on data from similar materials

Aspiration toxicity

Product:

Not an aspiration hazard., Based on available data, the classification criteria are not met.

11.2 Information on other hazards

Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

Product:

Remarks	:	H2S has a broad range of effects dependent on the airborne concentration and length of exposure: 0.02 ppm odour threshold, smell of rotten eggs; 10 ppm eye and respiratory tract irritation; 100 ppm coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes; 200 ppm potential for pulmonary oedema after >20-30 minutes; 500 ppm loss of consciousness after short exposures, potential for respiratory arrest; >1000ppm immediate loss of consciousness, may lead rapidly to death, prompt cardiopulmonary resuscitation may be required. Do not depend on sense of smell for warning. H2S causes rapid olfactory fatigue (deadens sense of smell). There is no evidence that H2S will accumulate in the body tissue after repeated exposure. Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12: Ecological information

12.1 Toxicity

Product:

Toxicity to fish	:	Remarks: Harmful LL/EL/IL50 >10 <= 100 mg/l
Toxicity to daphnia and other	:	Remarks: Toxic

aquatic invertebrates		LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to algae/aquatic plants	:	Remarks: Very toxic. LL/EL/IL50 < 1 mg/l
Toxicity to fish (Chronic toxicity)	:	Remarks: NOEC/NOEL > 0.01 - <=0.1 mg/l
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Remarks: NOEC/NOEL > 0.1 - <=1.0 mg/l
Toxicity to microorganisms	:	Remarks: LL/EL/IL50 > 100 mg/l

Components:

Gas oils (petroleum), heavy vacuum:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): 79 mg/l Exposure time: 96 h Method: Test(s) equivalent or similar to OECD Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): 0,22 mg/l Exposure time: 48 h Method: Test(s) equivalent or similar to OECD Guideline 202
Toxicity to algae/aquatic plants	:	EL50 (Raphidocelis subcapitata (freshwater green alga)): 0,32 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201 NOEL (Raphidocelis subcapitata (freshwater green alga)): 0,05 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Remarks: Data not available
M-Factor (Chronic aquatic toxicity)	:	1

residues (petroleum),atm.tower:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): 79 mg/l Exposure time: 96 h Method: Test(s) equivalent or similar to OECD Guideline 203 Remarks: Very toxic to fish.
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): 0,22 mg/l Exposure time: 48 h Method: Test(s) equivalent or similar to OECD Guideline 202
Toxicity to algae/aquatic plants	:	EL50 (Raphidocelis subcapitata (freshwater green alga)): 0,32 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201 NOEL (Raphidocelis subcapitata (freshwater green alga)): 0,05 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Remarks: Data not available
M-Factor (Chronic aquatic toxicity)	:	1

12.2 Persistence and degradability

Product:

Biodegradability	:	Remarks: Major constituents are inherently biodegradable, but contains components that may persist in the environment. Oxidises rapidly by photo-chemical reactions in air. Persistent per IMO criteria. International Oil Pollution Compensation (IOPC) Fund definition: "A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."

Components:

Gas oils (petroleum), heavy vacuum:

Biodegradability : Remarks: Data not available

residues (petroleum),atm.tower:
Biodegradability : Remarks: Data not available

12.3 Bioaccumulative potential

Product:
Bioaccumulation : Remarks: Contains constituents with the potential to bioaccumulate.

Components:

Gas oils (petroleum), heavy vacuum:
Bioaccumulation : Remarks: Data not available

residues (petroleum),atm.tower:
Bioaccumulation : Remarks: Data not available

12.4 Mobility in soil

Product:
Mobility : Remarks: Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day., Large volumes may penetrate soil and could contaminate groundwater., Floats on water., Contains volatile components.

12.5 Results of PBT and vPvB assessment

Product:
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 Endocrine disrupting properties

Product:
Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:
Additional ecological information : Films formed on water may affect oxygen transfer and damage organisms.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : 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.
Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.
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.
MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : 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

Remarks : EU Waste Disposal Code (EWC):
13 07 01* fuel oil and diesel.
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.

SECTION 14: Transport information

14.1 UN number or ID number

ADN : 3082

ADR	:	3082
RID	:	3082
IMDG	:	3082
IATA	:	3082

14.2 UN proper shipping name

ADN	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Petroleum distillate)
ADR	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Petroleum distillate)
RID	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Petroleum distillate)
IMDG	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Petroleum distillate)
IATA	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Petroleum distillate)

14.3 Transport hazard class(es)

ADN	:	9
ADR	:	9
RID	:	9
IMDG	:	9
IATA	:	9

14.4 Packing group

ADN

Packing group	:	III
Classification Code	:	M6
Labels	:	9 (N1, CMR, F)
CDNI Inland Water Waste Agreement	:	NST 3270 Heavy fuel oil

ADR

Packing group	:	III
Classification Code	:	M6
Hazard Identification Number	:	90
Labels	:	9

RID

Packing group	:	III
Classification Code	:	M6
Hazard Identification Number	:	90
Labels	:	9

IMDG
Packing group : III
Labels : 9

IATA
Packing group : III
Labels : 9

14.5 Environmental hazards

ADN
Environmentally hazardous : yes

ADR
Environmentally hazardous : yes

RID
Environmentally hazardous : yes

IMDG
Marine pollutant : yes

14.6 Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

14.7 Maritime transport in bulk according to IMO instruments

MARPOL Annex 1 rules apply for bulk shipments by sea.

SECTION 15: Regulatory information

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

REACH - List of substances subject to authorisation (Annex XIV) : Product is not subject to Authorisation under REACH.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

Other regulations:

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

Product is subject to Major accident risk decision 2015 (BRZO+) based on Seveso III directive (2012/18/EU).

The components of this product are reported in the following inventories:

EINECS : All components listed.

15.2 Chemical safety assessment

A Chemical Safety Assessment was performed for all substances of this product.

SECTION 16: Other information

Full text of H-Statements

EUH066	:	Repeated exposure may cause skin dryness or cracking.
H220	:	Extremely flammable gas.
H226	:	Flammable liquid and vapour.
H280	:	Contains gas under pressure; may explode if heated.
H304	:	May be fatal if swallowed and enters airways.
H315	:	Causes skin irritation.
H319	:	Causes serious eye irritation.
H330	:	Fatal if inhaled.
H332	:	Harmful if inhaled.
H350	:	May cause cancer.
H361	:	Suspected of damaging fertility or the unborn child.
H373	:	May cause damage to organs through prolonged or repeated exposure.
H400	:	Very toxic to aquatic life.
H410	:	Very toxic to aquatic life with long lasting effects.
H411	:	Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Acute Tox.	:	Acute toxicity
Aquatic Acute	:	Short-term (acute) aquatic hazard
Aquatic Chronic	:	Long-term (chronic) aquatic hazard
Asp. Tox.	:	Aspiration hazard
Carc.	:	Carcinogenicity
Flam. Liq.	:	Flammable liquids
Repr.	:	Reproductive toxicity
Skin Irrit.	:	Skin irritation
STOT RE	:	Specific target organ toxicity - repeated exposure

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China;

IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Training advice	:	Provide adequate information, instruction and training for operators.
Other information	:	This product is intended for use in closed systems only. The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB. A vertical bar (|) in the left margin indicates an amendment from the previous version.
Sources of key data used to compile the Safety Data Sheet	:	The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).

Classification of the mixture:		**Classification procedure:**
Acute Tox. 4	H332	Expert judgement and weight of evidence determination.
Carc. 1B	H350	Expert judgement and weight of evidence determination.
Repr. 2	H361	Expert judgement and weight of evidence determination.
STOT RE 2	H373	Expert judgement and weight of evidence determination.
Aquatic Acute 1	H400	Expert judgement and weight of evidence determination.
Aquatic Chronic 1	H410	Expert judgement and weight of evidence determination.

	EUH066	Expert judgement and weight of evidence determination.

Identified Uses according to the Use Descriptor System

Uses - Worker
Title : Manufacture of substance
- Industrial

Uses - Worker
Title : Use as an intermediate
- Industrial

Uses - Worker
Title : Distribution of substance
- Industrial

Uses - Worker
Title : Formulation & (re)packing of substances and mixtures
- Industrial

Uses - Worker
Title : Use as a fuel
- Industrial

Uses - Worker
Title : Use as a fuel
- Professional

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NL / EN

Exposure Scenario - Worker

300000000022	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Manufacture of substance- Industrial
Use Descriptor	**Sector of Use**: SU3, SU8, SU9 **Process Categories**: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15 **Environmental Release Categories**: ERC1, ERC4, ESVOC SpERC 1.1.v1
Scope of process	Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. 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 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/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 is implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems)	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Process samplingOutdoor	Sample via a closed loop or other system to avoid exposure Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374.
Marine vessel/barge (un)loading.	Avoid carrying out activities involving exposure for more than 4 hours Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Road tanker/rail car loading.	Ensure material transfers are under containment or extract ventilation. , or: Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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):	1,1E+07
Fraction of Regional tonnage used locally:	5,2E-02

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-04
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-06
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 humans via indirect exposure (primarily ingestion).	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no onsite 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 >= (%)	85,9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0,0
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 (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,3E+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. Available hazard data do not enable the derivation of a DNEL for carcinogenic 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

300000000023	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Use as an intermediate- Industrial
Use Descriptor	**Sector of Use**: SU3, SU8, SU9 **Process Categories**: PROC1, PROC2, PROC3, 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**
Product Characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/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 is implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems)	Handle substance within a closed system. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
General exposures (closed systems)Process samplingOutdoor	Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374.
Marine vessel/barge (un)loading.	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Avoid carrying out activities involving exposure for more than 4 hours Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Road tanker/rail car loading.	Ensure material transfers are under containment or extract ventilation. , or: Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Bulk product storage	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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):	1,3E+05

Fraction of Regional tonnage used locally:	1,2E-01
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-05
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-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.	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	54,0
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 (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,9E+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. Available hazard data do not enable the derivation of a DNEL for carcinogenic 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

300000000024	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Distribution of substance- Industrial
Use Descriptor	**Sector of Use**: SU3 **Process Categories**: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15 **Environmental Release Categories**: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SpERC 1.1b.v1
Scope of process	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) of substance within closed or contained systems, including incidental exposures during its sampling, storage, unloading, 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 the Substance in Mixture/Article	Covers use of substance/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 is implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

General exposures (closed systems)	Handle substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours Sample via a closed loop or other system to avoid exposure Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Process samplingOutdoor	Sample via a closed loop or other system to avoid exposure Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374.
Marine vessel/barge (un)loading.	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Avoid carrying out activities involving exposure for more than 4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Road tanker/rail car loading.	Ensure material transfers are under containment or extract ventilation. , or: Avoid carrying out activities involving exposure for more than 1 hour. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Bulk product storage	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Product sampling.	Sample via a closed loop or other system to avoid exposure Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combi-

	nation with 'basic' employee training.	
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):		1,1E+07
Fraction of Regional tonnage used locally:		2,0E-03
Annual site tonnage (tonnes/year):		2,3E+04
Maximum daily site tonnage (kg/day):		7,7E+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-04
Release fraction to wastewater from process (initial release prior to RMM):		1,0E-07
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 ingestion).		
No wastewater treatment required.		
Prevent discharge of undissolved substance to or recover from onsite wastewater.		
Treat air emission to provide a typical removal efficiency of (%)		90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)		0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)		0
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 (%)		88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)		88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)		3,8E+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. Available hazard data do not enable the derivation of a DNEL for carcinogenic 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

300000000025	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	Formulation & (re)packing of substances and mixtures- Industrial
Use Descriptor	**Sector of Use**: SU3, SU10 **Process Categories**: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15 **Environmental Release Categories**: ERC2, ESVOC SpERC 2.2.v1
Scope of process	Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.

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

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

	nation with specific activity training.
Bulk product storage	Store substance within a closed system. Avoid carrying out activities involving exposure for more than 4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Product sampling.	Sample via a closed loop or other system to avoid exposure Avoid carrying out activities involving exposure for more than 15 minutes. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

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):	1,1E+07
Fraction of Regional tonnage used locally:	2,6E-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):	2,2E-03
Release fraction to wastewater from process (initial release prior to RMM):	5,0E-06
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 humans via indirect exposure (primarily ingestion).	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	54,0
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 (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,1E+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. Available hazard data do not enable the derivation of a DNEL for carcinogenic 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

300000000026	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	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 additives and additive components) within closed or contained systems, including incidental exposures during 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 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/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 is implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
General exposures (closed	Handle substance within a closed system.

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

	4 hours Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
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):	1,1E+07
Fraction of Regional tonnage used locally:	1,4E-01
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 (initial release prior to RMM):	7,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	4,4E-07
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 onsite wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	87,7
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 (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5,2E+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	

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 carcinogenic 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

300000000027	
SECTION 1	**EXPOSURE SCENARIO TITLE**
Title	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 additives and additive components) within closed or contained systems, including incidental exposures during 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 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/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 is implemented.	
Contributing Scenarios	**Risk Management Measures**
General measures (carcinogens).	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.
General exposures (closed	Handle substance within a closed system.

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

	subsequent recycle. Clear spills immediately. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
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):	3,3E+05
Fraction of Regional tonnage used locally:	5,0E-04
Annual site tonnage (tonnes/year):	1,7E+02
Maximum daily site tonnage (kg/day):	4,6E+02
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
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 ingestion).	
No wastewater treatment required.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
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 >= (%)	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 (%)	88,8
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	88,8
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,3E+03
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. Available hazard data do not enable the derivation of a DNEL for carcinogenic 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).