

SAFETY DATA SHEET**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier**

Product name	Residual Fuel Oil (Flashpoint > 100°C) - Blended
Other means of identification	Fuel Oil (FO) Heavy Fuel Oil (HFO) Marine Bunker Fuel High Sulphur Fuel Oil (HSFO) Low Sulphur Fuel Oil (LSFO) Vacuum Residue (VACRES) Intermediate Fuel Oil (IFO) Intermediate Fuel Oil 180 (IFO 180) Intermediate Fuel Oil 380 (IFO 380)
	RMA 10, RMA 10LS, RMA 10XX, RMA 10LSXX RMA 30, RMA 30LS, RMA 30XX, RMA 30LSXX RMB 30, RMB 30LS, RMB 30XX, RMB 30LSXX RMD 80, RMD 80LS, RMD 80XX, RMD 80LSXX RME 180, RME 180LS, RME 180XX, RME 180LSXX RMF 180, RMF 180LS, RMF 180XX, RMF 180LSXX RMG 180, RMG 180LS, RMG 180XX, RMG 180LSXX RMG 380, RMG 380LS, RMG 380XX, RMG 380LSXX RMG 500, RMG 500XX RMG 700, RMG 700XX RMH 380, RMH 380LS, RMH 380XX, RMH 380LSXX RMH 700, RMH 700XX RMK 380, RMK 380LS, RMK 380XX, RMK 380LSXX RMK 500, RMK 500XX RMK 700, RMK 700XX
Proper shipping name	MARPOL Annex 1 rules apply for bulk shipments by sea.
SDS no.	SBX2296
Product type	Liquid.

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

Identified uses
Use as a fuel - Industrial Use as a fuel - Professional Formulation and (re)packing of substances and mixtures

Use of the substance/mixture	Fuel. For specific application advice see appropriate Technical Data Sheet or consult our company representative.
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1.3 Details of the supplier of the safety data sheet

Supplier	BP Europa S.E. – BP Nederland Rivium Boulevard 301 2909 LK Capelle a/d IJssel Rotterdam NETHERLANDS
	Tel: 010 249 1000
E-mail address	MSDSadvice@bp.com

1.4 Emergency telephone number

EMERGENCY TELEPHONE NUMBER	+31 10 249 1000 (24 hour) Netherlands: NVIC 030 274 8888 (Only to inform medical personnel (physicians, veterinarians, pharmacists) about symptoms and treatment of acute intoxications.)
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Product name	Residual Fuel Oil (Flashpoint > 100°C) - Blended	Product code	SBX2296	Page:	1/31
Version	1	Date of issue	30 May 2013	Format	Netherlands (Netherlands)
				Language	ENGLISH

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition Mixture

Classification according to Directive 1999/45/EC [DPD]

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification Carc. Cat. 2; R45
Repr. Cat. 3; R63
Xn; R20, R48/21
Xi; R38
N; R50/53

Human health hazards May cause cancer. Possible risk of harm to the unborn child. Also harmful by inhalation. Also harmful: danger of serious damage to health by prolonged exposure in contact with skin. Irritating to skin.

Environmental hazards Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

See Section 16 for the full text of the R phrases or H statements declared above.

See sections 11 and 12 for more detailed information on health effects and symptoms and environmental hazards.

2.2 Label elements

Hazard symbol or symbols



Indication of danger

Dangerous for the environment

Risk phrases

R45- May cause cancer.
R63- Possible risk of harm to the unborn child.
R20- Also harmful by inhalation.
R48/21- Also harmful: danger of serious damage to health by prolonged exposure in contact with skin.
R38- Irritating to skin.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

S53- Avoid exposure - obtain special instructions before use.
S36/37- Wear suitable protective clothing and gloves.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Hazardous ingredients

Fuel oil, residual
Residues (petroleum), atmospheric
residues (petroleum), thermal cracked
Residues (petroleum), hydrocracked
residues (petroleum), catalytic cracking
Gas oils (petroleum), heavy vacuum
Distillates (petroleum), light catalytic cracked
Distillates (petroleum), light thermal cracked

Supplemental label elements

Not applicable.

Special packaging requirements

Containers to be fitted with child-resistant fastenings Not applicable.

Tactile warning of danger Not applicable.

2.3 Other hazards

Other hazards which do not result in classification

Will cause burns if hot material contacts eyes.
Will cause burns if hot material contacts skin.
This material can contain hydrogen sulphide (H₂S), a very toxic and extremely flammable gas. This material may contain significant quantities of polycyclic aromatic hydrocarbons (PCAs), some of which have been shown by experimental studies to induce skin cancer.
Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency.
See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

SECTION 3: Composition/information on ingredients

Substance/mixture		Mixture		Classification		
Product/ingredient name	Identifiers	%	67/548/EEC	Regulation (EC) No. 1272/2008 [CLP]	Type	
Fuel oil, residual	REACH #: 01-2119474894-22 EC: 270-675-6 CAS: 68476-33-5 Index: 649-024-00-9	0 - 100	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1]	
Residues (petroleum), atmospheric	REACH #: 01-2119485969-10 EC: 269-777-3 CAS: 68333-22-2	0 - 95	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1]	
residues (petroleum), thermal cracked	REACH #: 01-2119484869-13 EC: 265-081-9 CAS: 64741-80-6	0 - 75	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1]	
residues (petroleum), hydrocracked	REACH #: 01-2119489964-16 EC: 265-076-1 CAS: 64741-75-9 Index: 649-012-00-3	0 - 25	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1]	
residues (petroleum), catalytic cracking	REACH #: 01-2119486485-25 EC: 295-511-0 CAS: 92061-97-7	0 - 25	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1]	
Gas oils (petroleum), heavy vacuum	REACH #: 01-2119487294-29 EC: 265-058-3 CAS: 64741-57-7	0 - 15	Carc. Cat. 2; R45 Repr. Cat. 3; R63 Xn; R20, R48/21 R66 N; R50/53	Acute Tox. 4, H332 Carc. 1B, H350 Repr. 2, H361d STOT RE 2, H373 Aquatic Chronic 1, H410	[1] [2]	
Distillates (petroleum), light catalytic cracked	REACH #: 01-2119489734-23 EC: 265-060-4 CAS: 64741-59-9 Index: 649-435-00-3	0 - 15	Carc. Cat. 2; R45 Xn; R20, R48/21, R65 Xi; R38 N; R50/53	Fam. Liq. 3, H226 Acute Tox. 4, H332 Skin Irrit. 2, H315 Carc. 1B, H350 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 1, H410	[1]	
Distillates (petroleum), light thermal cracked	REACH #: 01-2119472307-37 EC: 265-084-5 CAS: 64741-82-8	0 - 15	Carc. Cat. 2; R45 Xn; R20, R48/21, R65 Xi; R38 N; R50/53	Acute Tox. 4, H332 Skin Irrit. 2, H315 Carc. 1B, H350 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 1, H410	[1]	

See Section 16 for the full text of the R-phrases declared above.

See Section 16 for the full text of the H statements declared above.

Type

[1] Substance classified with a health or environmental hazard

[2] Substance with a workplace exposure limit

[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII

[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII

[5] Substance of equivalent concern


Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures**4.1 Description of first aid measures****Eye contact**

Hot product - Flood with water to dissipate heat. In the event of any product remaining, do not try to remove it other than by continued irrigation with water. Obtain medical attention immediately.

Cold product - Wash eye thoroughly with copious quantities of water, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists.

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SECTION 4: First aid measures

Skin contact	Hot Product - Flood skin with cold water to dissipate heat, cover with clean cotton or gauze, obtain medical advice immediately. Cold Product - Wash contaminated skin with soap and water. Remove contaminated clothing and wash underlying skin as soon as reasonably practicable. Never use gasoline, kerosene or other solvents to remove product from skin or clothing.
Inhalation	Get medical attention immediately. If inhaled, remove to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. EXPOSURE TO HYDROGEN SULPHIDE: Casualties suffering ill effects as a result of exposure to hydrogen sulphide should be immediately removed to fresh air and medical assistance obtained without delay. Unconscious casualties must be placed in the recovery position. Monitor breathing and pulse rate and if breathing has failed, or is deemed inadequate, respiration must be assisted, preferably by the mouth to mouth method. Administer external cardiac massage if necessary. Seek medical attention immediately.
Ingestion	Get medical attention immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately.
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	Treatment should in general be symptomatic and directed to relieving any effects. Inhalation of hydrogen sulphide may cause central respiratory depression leading to coma and death. It is irritant to the respiratory tract causing chemical pneumonitis and pulmonary oedema. The onset of pulmonary oedema may be delayed for 24 to 48 hours. Treat with oxygen and ventilate as appropriate. Administer broncho-dilators if indicated and consider administration of corticosteroids. Keep casualty under surveillance for 48 hours in case pulmonary oedema develops. Note: High Pressure Applications Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discoloured and extremely painful with extensive subcutaneous necrosis. Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimise tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.
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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray. This substance will float and can be reignited on surface water.
Unsuitable extinguishing media	Do not use water jet.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	Avoid spraying directly into storage containers because of the danger of boil-over. In a fire or if heated, a pressure increase will occur and the container may burst. Vapours can form explosive mixtures with air. Vapours are heavier than air and can spread along the ground or float on water surfaces to remote ignition sources. Vapours may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. Boil-over is the rapid increase in volume caused by the presence of water in hot product and the subsequent overflow from a tank.
Hazardous combustion products	Combustion products may include the following: carbon oxides (CO, CO ₂) (carbon monoxide, carbon dioxide) sulphur oxides (SO, SO ₂ , etc.) Hydrogen Sulphide (H ₂ S) unidentified organic and inorganic compounds

SECTION 5: Firefighting measures

5.3 Advice for firefighters

Special precautions for fire-fighters

Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. First move people out of line-of-sight of the scene and away from windows. This material is very toxic to aquatic organisms. No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Floors may be slippery; use care to avoid falling. Do not breathe vapour or mist. Ensure good ventilation. Put on appropriate personal protective equipment.

This material can contain hydrogen sulphide (H₂S), a very toxic and extremely flammable gas. Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work. Wear self-contained positive pressure breathing apparatus (SCBA).

For emergency responders

Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work. Wear self-contained breathing apparatus. Wear a suitable chemical protective suit. Chemical resistant boots. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

Storage tanks must be positioned within a bunded area.

Spillages in water or at sea:

Depending upon its temperature the product may be liquid, semi-solid or solid. Protect drains from spills and prevent entry of product, since this may result in blockage on cooling. Should blockage occur, notify the appropriate authority immediately. Product less dense than water: In case of small spillages in closed waters (i.e. ports), contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents. If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. If this is not possible, control the spreading of the spillage, and collect the product by skimming or other suitable mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities. Collect recovered product and other contaminated materials in suitable tanks or containers for recycle, recovery or safe disposal. Product which is denser than water will sink to the bottom, and usually no intervention will be feasible. If possible, collect the product and contaminated materials with mechanical means, and store/dispose of according to relevant regulations. In special situations (to be assessed on case-by-case basis, according to expert judgement and local conditions), excavations of trenches on the bottom to collect the product with sand may be a feasible option.

Depending upon its temperature the product may be liquid, semi-solid or solid. Protect drains from spills and prevent entry of product, since this may result in blockage on cooling. Should blockage occur, notify the appropriate authority immediately.

6.3 Methods and materials for containment and cleaning up

Small spill

Eliminate all ignition sources. Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill

Eliminate all ignition sources. Immediately contact emergency personnel. Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Dike spill area and do not allow product to reach sewage system and surface or ground water. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Contaminated absorbent material may pose the same hazard as the spilt product. Dispose of via a licensed waste disposal contractor.

SECTION 6: Accidental release measures

6.4 Reference to other sections

See Section 1 for emergency contact information.
 See Section 5 for firefighting measures.
 See Section 8 for information on appropriate personal protective equipment.
 See Section 12 for environmental precautions.
 See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

Protective measures

Contact with hot product may cause burns. Put on appropriate personal protective equipment. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Avoid contact of spilt material and runoff with soil and surface waterways. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Regular periodic self inspection of the skin is recommended, especially those areas subject to contamination. In the event of any localised changes in appearance or texture of the skin being noticed, medical advice should be sought without delay.

7.2 Conditions for safe storage, including any incompatibilities

Do not enter storage tanks. If entry to vessels is necessary, follow permit to work procedures. Electrical equipment should not be used unless it is intrinsically safe (i.e. will not produce sparks). Entry to any tanks or other confined space requires a full risk assessment and appropriate control measures to be put in place in conformance with appropriate regulations and industry practice on confined space entry. Explosive air/vapour mixtures can occur, particularly in unventilated or confined spaces. If hydrogen sulphide is present, the flammable limits can be from 4.3 to 45.5% by volume and its presence may promote the formation of pyrophoric iron compounds. If product comes into contact with hot surfaces, or leaks occur from pressurised fuel pipes, the vapour or mists generated will create a flammability or explosion hazard. Light hydrocarbon vapours can build up in the headspace of tanks. These can cause flammability/explosion hazards even at temperatures below the normal flash point (note: flash point must not be regarded as a reliable indicator of the potential flammability of vapour in tank headspaces). Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks. Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use. This material can contain hydrogen sulphide (H₂S), a very toxic and extremely flammable gas. Vapours containing hydrogen sulphide may accumulate during storage or transport and may also be vented during filling of tanks. Hydrogen sulphide has a typical "bad egg" smell but at high concentrations the sense of smell is rapidly lost, therefore do not rely on sense of smell for detecting hydrogen sulphide. Use specially designed measuring instruments for determining its concentration. When the product is pumped (e.g. during filling, discharge or ullaging) and when sampling, there is a risk of static discharge. Ensure equipment used is properly earthed or bonded to the tank structure.

Keep away from heat and direct sunlight. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Store in accordance with local regulations. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Use appropriate containment to avoid environmental contamination.

PGS Storage:

Storage according to PGS 15 or 16

7.3 Specific end use(s)

Recommendations

See section 1.2 and Exposure scenarios in annex, if applicable.

SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
Fuel oil, residual	ACGIH TLV (United States). TWA: 0.2 mg/m ³ , (Benzene-soluble)
Residues (petroleum), atmospheric	ACGIH TLV (United States). STEL: 1480 mg/m ³ 15 minutes. Form: Petrol (Recommended) STEL: 500 ppm 15 minutes. Form: Petrol (Recommended) TWA: 890 mg/m ³ 8 hours. Form: Petrol (Recommended) TWA: 330 ppm 8 hours. Form: Petrol (Recommended) TWA: 100 ppm 8 hours. Form: Stoddard Solvent (Recommended) TWA: 525 mg/m ³ 8 hours. Form: Stoddard Solvent (Recommended)
Gas oils (petroleum), heavy vacuum	MinSZW Wettelijke Grenswaarden (Netherlands). OEL, 8-h TWA: 5 mg/m ³ 8 hours. Issued/Revised: 1/2007 Form: mist
Distillates (petroleum), light catalytic cracked	ACGIH TLV (United States). TWA: 525 mg/m ³ 8 hours. Form: Stoddard Solvent (Recommended) TWA: 100 ppm 8 hours. Form: Stoddard Solvent (Recommended)
Hydrogen Sulphide	MinSZW Wettelijke Grenswaarden (Netherlands). OEL, 8-h TWA: 2.3 mg/m ³ 8 hours. Issued/Revised: 1/2007

Whilst specific OELs for certain components may be shown in this section, other components may be present in any mist, vapour or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Derived No Effect Level

Product/ingredient name	Type	Exposure	Value	Population	Effects	
Fuel oil, residual	DNEL	Short term Inhalation	15 minutes	4700 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 hours TWA	0.065 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	8 hours TWA	0.12 mg/m ³	Workers	Systemic
	DNEL	Long term Oral	24 hours TWA	0.015 mg/kg bw/day	Consumers	Systemic
Residues (petroleum), atmospheric	DNEL	Short term Inhalation	15 minutes	4700 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 hours TWA	0.065 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	8 hours TWA	0.12 mg/m ³	Workers	Systemic
	DNEL	Long term Oral	24 hours TWA	0.015 mg/kg bw/day	Consumers	Systemic
Residues (petroleum), hydrocracked	DNEL	Short term Inhalation	15 minutes	4700 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 hours TWA	0.065 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	8 hours TWA	0.12 mg/m ³	Workers	Systemic
	DNEL	Long term Oral	24 hours TWA	0.015 mg/kg bw/day	Consumers	Systemic
Gas oils (petroleum), heavy vacuum	DNEL	Short term Inhalation	15 minutes	4700 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 hours TWA	0.065 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	8 hours TWA	0.12 mg/m ³	Workers	Systemic

SECTION 8: Exposure controls/personal protection

Distillates (petroleum), light catalytic cracked	DNEL	Long term Oral	24 hours TWA	0.015 mg/kg bw/day	Consumers	Systemic
	DNEL	Short term Dermal	15 minutes	2230 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 hours TWA	2.4 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	8 hours TWA	30 mg/m ³	Workers	Systemic
	DNEL	Long term Oral	24 hours TWA	1 mg/kg bw/day	Man via the environment	Systemic

Predicted No Effect Concentration

No PNECs available

8.2 Exposure controls

Appropriate engineering controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective occupational exposure limits. All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained. Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards. The final choice of protective equipment will depend upon a risk assessment. It is important to ensure that all items of personal protective equipment are compatible.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

Respiratory protection

If local exhaust ventilation or other methods of ventilation are not possible or are insufficient, wear suitable respiratory protective devices. Wear suitable respiratory protective devices if there is a risk of exposure limits being exceeded. The choice of suitable respiratory device will depend upon a risk assessment of the workplace environment and the task being carried out. If required, the respiratory device must be certified as safe in defined explosive atmospheres (EX Label). Respiratory protective devices must be checked to ensure they fit correctly each time they are worn. Please consult European standard EN 529 for further guidance on the selection, use, care and maintenance of respiratory protective devices.

Suitable breathing apparatus (independent of ambient atmosphere) must be worn if any of the following situations apply.

- When the workplace atmosphere is considered to be immediately dangerous to life and health.
- When there is a risk of the workplace atmosphere being oxygen deficient.
- When the workplace atmosphere is uncontrolled.
- When the workplace atmosphere is unknown.
- When there is a risk of loss of consciousness or asphyxiation
- When entry into a confined space is required.
- When there is a risk of gases being released that could be a fire or explosion hazard.
- When the concentration of contaminants in the atmosphere exceeds the level of protection (maximum allowed concentration) given by a filtering device
- When the contaminants have a low odour that would not be tasted or smelt by the wearer of a filtering device if the filter became exhausted or saturated.
- When there is a risk of hydrogen sulphide exposure limits being exceeded.

If there is a requirement for the use of a respiratory protective device, but the use of breathing apparatus (independent of ambient atmosphere) is not required, then a suitable filtering device must be worn.

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product.

Recommended: Gas filter suitable for gases and vapours. Filter type: A. Combined filter suitable for gases, vapours and particles (dust, smoke, mist, aerosol). Filter type: AP.

Eye/face protection

Recommended: Chemical splash goggles.

Skin protection

SECTION 8: Exposure controls/personal protection

Hand protection

General Information:

Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. The correct choice of protective gloves depends upon the chemicals being handled, and the conditions of work and use. Most gloves provide protection for only a limited time before they must be discarded and replaced (even the best chemically resistant gloves will break down after repeated chemical exposures).

Gloves should be chosen in consultation with the supplier / manufacturer and taking account of a full assessment of the working conditions.

Recommended: Nitrile gloves.

Breakthrough time:

Breakthrough time data are generated by glove manufacturers under laboratory test conditions and represent how long a glove can be expected to provide effective permeation resistance. It is important when following breakthrough time recommendations that actual workplace conditions are taken into account. Always consult with your glove supplier for up-to-date technical information on breakthrough times for the recommended glove type. Our recommendations on the selection of gloves are as follows:

Continuous contact:

Gloves with a minimum breakthrough time of 240 minutes, or >480 minutes if suitable gloves can be obtained.

If suitable gloves are not available to offer that level of protection, gloves with shorter breakthrough times may be acceptable as long as appropriate glove maintenance and replacement regimes are determined and adhered to.

Short-term / splash protection:

Recommended breakthrough times as above.

It is recognised that for short-term, transient exposures, gloves with shorter breakthrough times may commonly be used. Therefore, appropriate maintenance and replacement regimes must be determined and rigorously followed.

Glove Thickness:

For general applications, we recommend gloves with a thickness typically greater than 0.35 mm.

It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:

- Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
- Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential.

Skin and body

Cold material:

Wear suitable protective clothing.

Footwear highly resistant to chemicals.

When there is a risk of ignition wear inherently fire resistant protective clothes and gloves.

Refer to standard: ISO 11612

When there is a risk of ignition from static electricity, wear anti-static protective clothing. For greatest effectiveness against static electricity, overalls, boots and gloves should all be anti-static.

Refer to standard: EN 1149

Cotton or polyester/cotton overalls will only provide protection against light superficial

SECTION 8: Exposure controls/personal protection

	contamination. Work clothing / overalls should be laundered on a regular basis. Laundering of contaminated work clothing should only be done by professional cleaners who have been told about the hazards of the contamination. Always keep contaminated work clothing away from uncontaminated work clothing and uncontaminated personal clothes. When the risk of skin exposure is high (from experience this could apply to the following tasks: cleaning work, maintenance and service, filling and transfer, taking samples and cleaning up spillages) then a chemical protective suit and boots will be required.
Thermal hazards	Hot material: Protection should be provided for exposed areas of the neck and head. Wear suitable protective clothing to protect against heat and brief contact with flame.
Environmental exposure controls	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	Liquid.
Colour	Brown./ Black. [Dark]
Odour	Oily.
Odour threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	150 to 750°C (302 to 1382°F)
Pour point	-15 to 36 °C
Flash point	Closed cup: >100°C (>212°F) [Pensky-Martens.]
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	Lower: 0.5% Upper: 5%
Vapour pressure	<0.133 kPa (<1 mm Hg) at 20°C
Vapour density	>0.9 [Air = 1]
Relative density	Not available.
Density	935 to 1020 kg/m ³ (0.935 to 1.02 g/cm ³) at 15°C
Solubility(ies)	insoluble in water.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Kinematic: 180 to 1600 mm ² /s (180 to 1600 cSt) at 40°C Kinematic: >10 mm ² /s (>10 cSt) at 50°C
Explosive properties	Not available.
Oxidising properties	Not available.


9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
10.2 Chemical stability	The product is stable.
10.3 Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous polymerisation will not occur. Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	Avoid all possible sources of ignition (spark or flame). Avoid excessive heat.

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SECTION 10: Stability and reactivity

10.5 Incompatible materials Reactive or incompatible with the following materials: oxidising materials.

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

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result / Route	Test authority / Number	Species	Dose	Exposure	Remarks
Fuel oil, residual	LC50 Inhalation Dusts and mists	EPA 798.115	Rat	4500 mg/m ³	4 hours	Based on Carbon black oil
	LC50 Inhalation Dusts and mists	EPA 798.115	Rat	4100 mg/m ³	4 hours	Based on Carbon black oil
	LD50 Dermal	EU B.3	Rabbit	>2000 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Dermal	OECD 434	Rabbit	>2000 mg/kg	-	Based on Heavy fuel oil
	LD50 Oral	OECD 401	Rat	5270 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), atmospheric	LD50 Oral	OECD 401	Rat	4320 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LC50 Inhalation Dusts and mists	EPA 798.115	Rat	4500 mg/m ³	4 hours	Based on Carbon black oil
	LC50 Inhalation Dusts and mists	EPA 798.115	Rat	4100 mg/m ³	4 hours	Based on Carbon black oil
	LD50 Dermal	EU B.3	Rabbit	>2000 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Dermal	OECD 434	Rabbit	>2000 mg/kg	-	Based on Heavy fuel oil
Residues (petroleum), hydrocracked	LD50 Oral	OECD 401	Rat	5270 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Oral	OECD 401	Rat	4320 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LC50 Inhalation Dusts and mists	EPA 798.115	Rat	4500 mg/m ³	4 hours	Based on Carbon black oil
	LC50 Inhalation	EPA 798.115	Rat	4100 mg/m ³	4 hours	Based on Carbon

SECTION 11: Toxicological information

Gas oils (petroleum), heavy vacuum	Dusts and mists						black oil
	LD50 Dermal	EU	B.3	Rabbit	>2000 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Dermal	OECD	434	Rabbit	>2000 mg/kg	-	Based on Heavy fuel oil
	LD50 Oral	OECD	401	Rat	5270 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Oral	OECD	401	Rat	4320 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LC50 Inhalation	EPA	OTS 798, 115	Rat	4500 mg/m ³	4 hours	Based on Carbon black oil
	LC50 Inhalation	EPA	OTS 798, 115	Rat	4100 mg/m ³	4 hours	Based on Carbon black oil
	LD50 Dermal	EU	B.3	Rabbit	>2000 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LD50 Dermal	OECD	434	Rabbit	>2000 mg/kg	-	Based on Heavy fuel oil
	LD50 Oral	OECD	401	Rat	5270 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
Distillates (petroleum), light catalytic cracked	LD50 Oral	OECD	401	Rat	4320 mg/kg	-	Based on Catalytic cracked clarified oil (CCCO)
	LC50 Inhalation	OECD	403	Rat	4.65 to 5.55 mg/l aerosol	4 hours	Based on light catalytically cracked distillate
	LD50 Dermal	OECD	402	Rabbit	>2000 mg/kg intact and abraded skin	-	Based on light catalytically cracked distillate
	LD50 Oral	OECD	401	Rat	3200 mg/kg	-	Based on light catalytically cracked distillate
	LD50 Oral	OECD	401	Rat	4660 mg/kg	-	Based on light catalytically cracked distillate

[Irritation/Corrosion](#)

SECTION 11: Toxicological information

Product/ingredient name	Test authority / Test number		Species	Route / Result		Test concentration	Remarks
Fuel oil, residual	EU	B.4	Rabbit	Skin - Non-irritant	-		Based on Heavy fuel oil
	EU	B.5	Rabbit	Eyes - Non-irritating to the eyes.	-		Based on Heavy fuel oil
Residues (petroleum), atmospheric	EU	B.4	Rabbit	Skin - Non-irritant	-		Based on Heavy fuel oil
	EU	B.5	Rabbit	Eyes - Non-irritating to the eyes.	-		Based on Heavy fuel oil
Residues (petroleum), hydrocracked	EU	B.4	Rabbit	Skin - Non-irritant	-		Based on Heavy fuel oil
	EU	B.5	Rabbit	Eyes - Non-irritating to the eyes.	-		Based on Heavy fuel oil
Gas oils (petroleum), heavy vacuum	EU	B.4	Rabbit	Skin - Non-irritant	-		Based on Heavy fuel oil
	EU	B.5	Rabbit	Eyes - Non-irritating to the eyes.	-		Based on Heavy fuel oil
Distillates (petroleum), light catalytic cracked	OECD	405	Rabbit	Eyes - Non-irritating to the eyes.	-		Based on light catalytically cracked distillate
	OECD	404	Rabbit	Skin - Irritant	-		Based on light catalytically cracked distillate

Sensitiser

Product/ingredient name	Route	Test authority / Test number		Species	Result	Remarks
Fuel oil, residual	skin	EU	B.6	Guinea pig	Not sensitising	Based on Heavy fuel oil
Residues (petroleum), atmospheric	skin	EU	B.6	Guinea pig	Not sensitising	Based on Heavy fuel oil
Residues (petroleum), hydrocracked	skin	EU	B.6	Guinea pig	Not sensitising	Based on Heavy fuel oil
Gas oils (petroleum), heavy vacuum	skin	EU	B.6	Guinea pig	Not sensitising	Based on Heavy fuel oil
Distillates (petroleum), light catalytic cracked	skin	OECD	406	Guinea pig	Not sensitising	Based on light catalytically cracked distillate

GERM CELL MUTAGENICITY

Product/ingredient name	Test authority / Test number	Cell	Type	Result	Remarks	
Fuel oil, residual	Equivalent to OECD 476	-	Experiment: In vitro	Subject: Mammal - species unspecified	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 471	-	Experiment: In vitro	Subject: Non-mammalian species	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 475	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 474	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), atmospheric	Equivalent to OECD 476	-	Experiment: In vitro	Subject: Mammal - species unspecified	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 471	-	Experiment: In vitro	Subject: Non-mammalian species	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 475	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)

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Residues (petroleum), hydrocracked	Equivalent to OECD 474	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 476	-	Experiment: In vitro	Subject: Mammal - species unspecified	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 471	-	Experiment: In vitro	Subject: Non-mammalian species	Positive	Based on Catalytic cracked clarified oil (CCCO)
Gas oils (petroleum), heavy vacuum	Equivalent to OECD 475	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 474	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 476	-	Experiment: In vitro	Subject: Mammal - species unspecified	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 471	-	Experiment: In vitro	Subject: Non-mammalian species	Positive	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 475	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	Equivalent to OECD 474	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on Catalytic cracked clarified oil (CCCO)
	OECD 471	Cell: Somatic	Experiment: In vitro	Subject: Non-mammalian species	Positive	Based on coker gas oil
Distillates (petroleum), light catalytic cracked	Equivalent to OECD 475	Cell: Germ	Experiment: In vivo	Subject: Unspecified	Negative	Based on straight run middle distillate

Carcinogenicity

Product/ingredient name	Test authority / Test number	Species	Route	Exposure	Result	Remarks	
Fuel oil, residual	Equivalent to OECD	451	Mouse	Dermal	Lifetime	Positive	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), atmospheric	Equivalent to OECD	451	Mouse	Dermal	Lifetime	Positive	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), hydrocracked	Equivalent to OECD	451	Mouse	Dermal	Lifetime	Positive	Based on Catalytic cracked clarified oil (CCCO)
Gas oils (petroleum), heavy vacuum	Equivalent to OECD	451	Mouse	Dermal	Lifetime	Positive	Based on Catalytic cracked clarified oil (CCCO)
Distillates (petroleum), light catalytic cracked	Equivalent to OECD	451	Mouse	Dermal	2 years	Positive	Based on catalytically cracked light cycle oil

Reproductive toxicity

SECTION 11: Toxicological information

Product/ingredient name	Test authority / Test number	Species	Route	Exposure	Developmental	Maternal toxicity	Fertility	Remarks
Fuel oil, residual	EPA OTS 798.4700	Rat	Dermal	70 days no effects observed	-	-	Negative	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), atmospheric	EPA OTS 798.4900	Rat	Dermal	20 days Effects observed	Positive	-	-	Based on atmospheric residue
	EPA OTS 798.4700	Rat	Dermal	70 days no effects observed	-	-	Negative	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), hydrocracked	EPA OTS 798.4900	Rat	Dermal	20 days Effects observed	Positive	-	-	Based on atmospheric residue
	EPA OTS 798.4700	Rat	Dermal	70 days no effects observed	-	-	Negative	Based on Catalytic cracked clarified oil (CCCO)
Gas oils (petroleum), heavy vacuum	EPA OTS 798.4900	Rat	Dermal	20 days Effects observed	Positive	-	-	Based on atmospheric residue
	EPA OTS 798.4700	Rat	Dermal	70 days no effects observed	-	-	Negative	no effects observed (Based on Catalytic cracked clarified oil (CCCO))
Distillates (petroleum), light catalytic cracked	not guideline	-	Rat	31 days Effects observed at maternally toxic doses.	-	-	Negative	Based on light coker gas oil
	not guideline	-	Rat	31 days	Negative	-	-	Based on light coker gas oil

Specific target organ toxicity

Product / Ingredient Name	Hazard	Test authority / Test number	Species	Route	Type	Dose	Exposure	Target organs	Remarks
Fuel oil, residual	STOT - RE	Equivalent to EPA OPPTS 870.3250	Rat	Dermal	LOAEL	20 to 200 mg/kg	90 days	liver blood	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	Equivalent to OECD 401	Rat	Oral	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	EPA OTS 798.1150	Rat	Inhalation	LOAEL	10 to 20 mg/l	4 hours	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	OECD 434	Rabbit	Dermal	LOAEL	>2000 mg/kg	-	-	Based on Catalytic

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Residues (petroleum), atmospheric	STOT - RE	Equivalent to EPA	OPPTS 870.3250	Rat	Dermal	LOAEL	20 to 200 mg/kg	90 days	liver blood	cracked clarified oil (CCCO) Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	Equivalent to OECD	401	Rat	Oral	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	EPA	OTS 798.1150	Rat	Inhalation	LOAEL	10 to 20 mg/l	4 hours	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	OECD	434	Rabbit	Dermal	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
Residues (petroleum), hydrocracked	STOT - RE	Equivalent to EPA	OPPTS 870.3250	Rat	Dermal	LOAEL	20 to 200 mg/kg	90 days	liver blood	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	Equivalent to OECD	401	Rat	Oral	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	EPA	OTS 798.1150	Rat	Inhalation	LOAEL	10 to 20 mg/l	4 hours	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	OECD	434	Rabbit	Dermal	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
Gas oils (petroleum), heavy vacuum	STOT - RE	Equivalent to EPA	OPPTS 870.3250	Rat	Dermal	LOAEL	20 to 200 mg/kg	90 days	liver blood	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	Equivalent to OECD	401	Rat	Oral	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	EPA	OTS 798.1150	Rat	Inhalation	LOAEL	10 to 20 mg/l	4 hours	-	Based on Catalytic cracked clarified oil (CCCO)
	STOT - SE	Equivalent to OECD	434	Rabbit	Dermal	LOAEL	>2000 mg/kg	-	-	Based on Catalytic cracked clarified oil (CCCO)
Distillates (petroleum), light catalytic cracked	STOT - RE	Equivalent to OECD	410	Rabbit	Dermal	NOAEL	>200 mg/kg bw/day	28 days	blood	Based on light catalytically cracked distillate
	STOT - RE	Equivalent to OECD	411	Rat	Dermal	NOAEL	20 to 200 mg/kg bw/day	90 days	liver Thymus	Based on light catalytically cracked

SECTION 11: Toxicological information

STOT - RE	Equivalent to OECD	411	Rat	Dermal	LOAEL	20 to 200 mg/kg bw/day	90 days	blood kidneys	distillate Based on coker light gas oil
STOT - SE	Equivalent to OECD	401	Rat	Oral	LOAEL	>2000 mg/kg bw	90 days	-	Based on Catalytic cracked clarified oil (CCCO)
STOT - SE	Equivalent to OECD	402	Rabbit	Dermal	LOAEL	>2000 mg/kg bw	90 days	-	Based on Catalytic cracked clarified oil (CCCO)
STOT - RE	Equivalent to OECD	413	Rat	Inhalation	NOAEL	>0.2 mg/l 6 hours	13 weeks	-	Based on Diesel fuel
STOT - RE	Equivalent to OECD	403	Rat	Inhalation	LOAEL	>5 mg/l 4 hours	4 hours	-	Based on Catalytic cracked clarified oil (CCCO)

Information on the likely routes of exposure

Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

- Inhalation** Harmful by inhalation.
- Ingestion** No known significant effects or critical hazards.
- Skin contact** Irritating to skin. Will cause burns if hot material contacts skin.
- Eye contact** Will cause burns if hot material contacts eyes.

Symptoms related to the physical, chemical and toxicological characteristics

- Inhalation** Adverse symptoms may include the following:
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
- Ingestion** Adverse symptoms may include the following:
reduced foetal weight
increase in foetal deaths
skeletal malformations
- Skin contact** Adverse symptoms may include the following:
irritation
redness
- Eye contact** No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

- Inhalation** Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. May be harmful by inhalation if exposure to vapour, mists or fumes resulting from thermal decomposition products occurs. Vapour, mist or fume may irritate the nose, mouth and respiratory tract.
- Ingestion** If swallowed, may irritate the mouth, throat and digestive system. If swallowed, may cause abdominal pain, stomach cramps, nausea, vomiting and diarrhoea.
- Skin contact** As with all such products containing potentially harmful levels of PCAs, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.
- Eye contact** Potential risk of transient stinging or redness if accidental eye contact occurs. Vapour, mist or fume may cause eye irritation. Exposure to vapour, mist or fume may cause stinging, redness and watering of the eyes.

Potential chronic health effects

- General** Harmful: danger of serious damage to health by prolonged exposure in contact with skin. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer.
- Carcinogenicity** May cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** No known significant effects or critical hazards.
- Developmental effects** Possible risk of harm to the unborn child.
- Fertility effects** No known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Test authority / Test number	Species	Type / Result	Exposure	Effects	Remarks	
Fuel oil, residual	OECD 202	Daphnia	Acute EL50 2 mg/l Nominal Fresh water	48 hours	Mobility	Based on Heavy fuel oil	
	OECD 203	Fish	Acute LL50 79 mg/l Nominal Fresh water	96 hours	-	Based on residual fuel oil	
	Modelled data	Daphnia	Chronic NOEL 0.27 mg/l Nominal Fresh water	21 days	Reproduction	-	
	Modelled data	Fish	Chronic NOEL 0.1 mg/l Nominal Fresh water	28 days	Mortality	-	
	Residues (petroleum), atmospheric	OECD 202	Daphnia	Acute EL50 2 mg/l Nominal Fresh water	48 hours	Mobility	Based on Heavy fuel oil
		OECD 203	Fish	Acute LL50 79 mg/l Nominal Fresh water	96 hours	-	Based on residual fuel oil
Modelled data		Daphnia	Chronic NOEL 0.27 mg/l Nominal Fresh water	21 days	Reproduction	-	
Modelled data		Fish	Chronic NOEL 0.1 mg/l Nominal Fresh water	28 days	Mortality	-	
Residues (petroleum), hydrocracked		OECD 202	Daphnia	Acute EL50 2 mg/l Nominal Fresh water	48 hours	Mobility	Based on Heavy fuel oil
		OECD 203	Fish	Acute LL50 79 mg/l Nominal Fresh water	96 hours	-	Based on residual fuel oil
	Modelled data	Daphnia	Chronic NOEL 0.27 mg/l Nominal Fresh water	21 days	Reproduction	-	
	Modelled data	Fish	Chronic NOEL 0.1 mg/l Nominal Fresh water	28 days	Mortality	-	
	Gas oils (petroleum), heavy vacuum	OECD 202	Daphnia	Acute EL50 2 mg/l Nominal Fresh water	48 hours	Mobility	Based on Heavy fuel oil
		OECD 203	Fish	Acute LL50 79 mg/l Nominal Fresh water	96 hours	-	Based on residual fuel oil
Modelled data		Daphnia	Chronic NOEL 0.27 mg/l Nominal Fresh water	21 days	Reproduction	-	
Modelled data		Fish	Chronic NOEL 0.1 mg/l Nominal Fresh water	28 days	Mortality	-	
Distillates (petroleum), light catalytic cracked		OECD 202	Daphnia	Acute EL50 2 mg/l Nominal Fresh water	48 hours	Mobility	Based on Heavy fuel oil
		OECD 203	Fish	Acute LL50 79 mg/l Nominal Fresh water	96 hours	-	Based on residual fuel oil
	Modelled data	Daphnia	Chronic NOEL 0.27 mg/l Nominal Fresh water	21 days	Reproduction	-	
	Modelled data	Fish	Chronic NOEL 0.1 mg/l Nominal Fresh water	28 days	Mortality	-	
	Modelled data	Algae	Acute EL50 0.202 mg/l Nominal Fresh water	72 hours	(growth rate)	-	
	Modelled data	Daphnia	Acute EL50 0.319 mg/l Nominal Fresh water	48 hours	Mobility	-	
	Modelled data	Other	Acute EL50 1.954 mg/l Nominal Fresh water	40 hours	growth inhibition	-	
	Modelled data	Fish	Acute LL50 0.156 mg/l Nominal Fresh water	96 hours	-	-	
	Modelled data	Other	Acute NOEL 0.241 mg/l Nominal Fresh water	40 hours	growth inhibition	-	
	not guideline	Other	Chronic NOAEL 5000 ppm Fresh water	18 weeks	Growth	-	
	Modelled data	Daphnia	Chronic NOEL 0.053 mg/l Nominal Fresh water	21 days	Immobilisation	-	
	Modelled data	Fish	Chronic NOEL 0.029 mg/l Nominal Fresh water	14 days	Mortality	-	


Environmental hazards Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

12.2 Persistence and degradability

Partially biodegradable.

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate through food chains in the environment.

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12.4 Mobility in soil

Soil/water partition coefficient (K_{oc})

Not available.

Mobility

Spillages may penetrate the soil causing ground water contamination. This material may accumulate in sediments.

12.5 Results of PBT and vPvB assessment

PBT

Not applicable.

vPvB

Not applicable.

12.6 Other adverse effects

Other ecological information

This product has a density close to that of water. If released to water the product may sink. Spills are unlikely to form a distinct film on the water surface, and may become dispersed as globules if mixed or agitated.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product

Methods of disposal

The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Hazardous waste

Yes.

European waste catalogue (EWC)

Waste code	Waste designation
13 07 01*	fuel oil and diesel

However, deviation from the intended use and/or the presence of any potential contaminants may require an alternative waste disposal code to be assigned by the end user.

Packaging

Methods of disposal

Dispose of via an authorised person/ licensed waste disposal contractor in accordance with local regulations. Recycle, if possible.

Special precautions

This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Empty containers represent a fire hazard as they may contain flammable product residues and vapour. Never weld, solder or braze empty containers. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Other information

Empty packages may contain some remaining product. Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed.


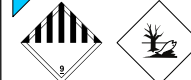


Empty containers represent a fire hazard as they may contain flammable product residues and vapour. Never weld, solder or braze containers unless they are cleaned and do not contain flammable vapours and residues.

At sea, used or unwanted product should be stored for eventual discharge into port approved waste oil disposal facilities.

Dusts generated during the removal of ash deposits from engine/boiler combustion surfaces or exhaust spaces, will be harmful if inhaled and may cause nausea and eye, nose and throat irritation. Repeated contact may result in serious irreversible disorders.

Before working in combustion/exhaust spaces or handling fuel oil ash/dust the area should be thoroughly damped down with water. If this is not possible, wear full breathing apparatus or positive pressure filter sets. Protective clothing must always be worn. When inspecting combustion/exhaust spaces, wear full face dust respirator and protective clothing.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	IATA
14.1 UN number	UN 3082	UN 3082	UN 3082	UN 3082
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heavy fuel oil)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heavy fuel oil)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.. Marine pollutant (Heavy fuel oil)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heavy fuel oil)
14.3 Transport hazard class(es)	9 	9 	9 	9 
14.4 Packing group	III	III	III	III
14.5 Environmental hazards	Yes.	Yes.	Yes.	No.
Additional information	<u>Hazard identification number</u> 90 <u>Tunnel code</u> E	<u>Remarks</u> Table:C.Danger: 9+ (N1, CMR, F or S).	<u>Emergency schedules (EmS)</u> F-A, S-F	-

14.6 Special precautions for user Not available.

ADR/RID Classification code: M6

ADN Classification code: M6

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code **Proper shipping name** 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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles Restricted to professional users.

Other regulations

REACH Status The company, as identified in Section 1, sells this product in the EU in compliance with the current requirements of REACH.

United States inventory (TSCA 8b) Not determined.

Australia inventory (AICS) Not determined.

Canada inventory Not determined.

China inventory (IECSC) Not determined.

Japan inventory (ENCS) Not determined.

Korea inventory (KECI) Not determined.

SECTION 15: Regulatory information

Philippines inventory (PICCS) Not determined.

[National regulations](#)

15.2 Chemical Safety Assessment

Not applicable.

SECTION 16: Other information

Abbreviations and acronyms

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway
 ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
 ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 CAS = Chemical Abstracts Service
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 CSA = Chemical Safety Assessment
 CSR = Chemical Safety Report
 DMEL = Derived Minimal Effect Level
 DNEL = Derived No Effect Level
 DPD = Dangerous Preparations Directive [1999/45/EC]
 DSD = Dangerous Substances Directive [67/548/EEC]
 EINECS = European Inventory of Existing Commercial chemical Substances
 ES = Exposure Scenario
 EUH statement = CLP-specific Hazard statement
 EWC = European Waste Catalogue
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 OECD = Organisation for Economic Co-operation and Development
 PBT = Persistent, Bioaccumulative and Toxic
 PNEC = Predicted No Effect Concentration
 RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
 RRN = REACH Registration Number
 SADT = Self-Accelerating Decomposition Temperature
 SVHC = Substances of Very High Concern
 STOT-RE = Specific Target Organ Toxicity - Repeated Exposure
 STOT-SE = Specific Target Organ Toxicity - Single Exposure
 TWA = Time weighted average
 UN = United Nations
 UVCB = Complex hydrocarbon substance
 VOC = Volatile Organic Compound
 vPvB = Very Persistent and Very Bioaccumulative

Full text of abbreviated H statements

H304 May be fatal if swallowed and enters airways.
 H315 Causes skin irritation.
 H332 Harmful if inhaled.
 H350 May cause cancer.
 H361d Suspected of damaging the unborn child.
 H373 May cause damage to organs through prolonged or repeated exposure.
 H410 Very toxic to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS]

Acute Tox. 4, H332 ACUTE TOXICITY: INHALATION - Category 4
 Aquatic Chronic 1, H410 LONG-TERM AQUATIC HAZARD - Category 1
 Asp. Tox. 1, H304 ASPIRATION HAZARD - Category 1
 Carc. 1B, H350 CARCINOGENICITY - Category 1B
 Repr. 2, H361d TOXIC TO REPRODUCTION [Unborn child] - Category 2
 Skin Irrit. 2, H315 SKIN CORROSION/IRRITATION - Category 2
 STOT RE 2, H373 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) [blood system and liver] - Category 2

SECTION 16: Other information

Full text of abbreviated R phrases
 R45- May cause cancer.
 R63- Possible risk of harm to the unborn child.
 R20- Also harmful by inhalation.
 R48/21- Also harmful: danger of serious damage to health by prolonged exposure in contact with skin.
 R65- Also harmful: may cause lung damage if swallowed.
 R38- Irritating to skin.
 R66- Repeated exposure may cause skin dryness or cracking.
 R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Full text of classifications [DSD/DPD]
 Carc. Cat. 2 - Carcinogen category 2
 Repr. Cat. 3 - Toxic to reproduction category 3
 Xn - Harmful
 Xi - Irritant
 N - Dangerous for the environment

History

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Prepared by Product Stewardship

 **Indicates information that has changed from previously issued version.**

Notice to reader

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Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition	Mixture
Code	BX2296
Product name	Residual Fuel Oil (Flashpoint > 100°C) - Blended

Section 1:: Title

Short title of the exposure scenario	Heavy Fuel Oil Use of Substance as a Fuel - Industrial
List of use descriptors	Identified use name: Use as a fuel - Industrial Process Category: PROC01, PROC02, PROC03, PROC08a, PROC08b, PROC16 Sector of end use: SU03 Subsequent service life relevant for that use: No. Environmental Release Category: ERC07 Specific Environmental Release Category: ESVOC SpERC 7.12a.v1

Processes and activities covered by the exposure scenario	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.
Assessment Method	See Section 3

Section 2: Operational conditions and risk management measures

Section 2.1: Control of worker exposure

Product characteristics:

Physical state: Liquid, vapour pressure < 0.5 kPa at STP.

Concentration of substance in product: Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.

Contributing scenarios: Operational conditions and 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 its use is identified for certain contributing scenarios; 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. Sample via a closed loop or other system to avoid exposure. Avoid carrying out operation for more than 4 hours. Wear chemical-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 chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

bulk closed unloading Outdoor.: Transfer via enclosed lines. Avoid carrying out operation for more than 4 hours. Wear chemical-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 chemical-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 operation for more than 4 hours. Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

Bulk product storage: Store substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Avoid carrying out operation for more than 4 hours. Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

Use as a fuel (closed systems): Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

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

Section 2.2:: Control of environmental exposure

Product characteristics: Substance is complex UVCB Predominantly hydrophobic

Amounts used:

Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.1e7
Fraction of Regional tonnage used locally:	1.4e-1
Annual site tonnage (tonnes/year):	1.5e6
Maximum daily site tonnage (kg/day):	5.0e6

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environment factors not influenced by risk management:

Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Release fraction to air from process (initial release prior to RMM):	7.0e-4
Release fraction to soil from process (initial release prior to RMM):	0
Release fraction to wastewater from process (initial release prior to RMM):	4.4e-7

Technical conditions and measures at process level (source) to prevent release: Common practices vary across sites thus conservative process release estimates used.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil: Risk from environmental exposure is driven by freshwater sediment. On-site 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 on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ³ (%):	87.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ³ (%):	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 on-site sewage treatment (%):	88.8
Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs (%):	88.8
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d):	5.2e6
Assumed on-site sewage treatment plant flow (m^3/d):	2000

Conditions and measures related to external treatment of waste for disposal:	Combustion emissions limited by required exhaust emission controls. 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 from the substance is generated.
RCR - Air Compartment Driven:	5.73E-01
RCR - Water Compartment Driven:	9.09E-01

Section 3:: Exposure estimation

Exposure estimation and reference to its source - Environment	
Exposure assessment (environment):	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure estimation and reference to its source - Workers	
Exposure assessment (human):	Not available.

Section 4:: Guidance to check compliance with the exposure scenario

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



Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition	Mixture
Code	8BX2296
Product name	Residual Fuel Oil (Flashpoint > 100°C) - Blended

Section 1:: Title

Short title of the exposure scenario	Heavy Fuel Oil Use of Substance as a Fuel - Professional
List of use descriptors	Identified use name: Use as a fuel - Professional Process Category: PROC01, PROC02, PROC03, PROC08a, PROC08b, PROC16 Sector of end use: SU22 Subsequent service life relevant for that use: No. Environmental Release Category: ERC09a, ERC09b Specific Environmental Release Category: ESVOC SpERC 9.12b.v1

Processes and activities covered by the exposure scenario	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.
Assessment Method	See Section 3

Section 2: Operational conditions and risk management measures

Section 2.1: Control of worker exposure

Product characteristics:

Physical state: Liquid, vapour pressure < 0.5 kPa at STP.

Concentration of substance in product: Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.

Contributing scenarios: Operational conditions and 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 its use is identified for certain contributing scenarios; 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) 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 chemical-resistant gloves (tested to EN374) in combination with specific activity training.

General exposures (closed systems): Handle substance within a closed system. Sample via a closed loop or other system to avoid exposure. Avoid carrying out activities involving exposure for more than 1 hour. Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

bulk closed unloading: Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. Avoid carrying out activities involving exposure for more than 1 hour. or Ensure material transfers are under containment or extract ventilation.

Drum/batch transfers: Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Wear

chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. Avoid carrying out activities involving exposure for more than 1 hour. or Ensure material transfers are under containment or extract ventilation.

refuelling: Ensure material transfers are under containment or extract ventilation. Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. Avoid carrying out activities involving exposure for more than 1 hour.

Use as a fuel (closed systems): Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

Equipment cleaning and maintenance: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Drain down system prior to equipment break-in or maintenance. Retain drain-downs in sealed storage pending disposal or for subsequent recycle. Clear spills immediately.

Section 2.2:: Control of environmental exposure

Product characteristics:	Substance is complex UVCB Predominantly hydrophobic
Amounts used:	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	3.3e5
Fraction of Regional tonnage used locally:	5.0e-4
Annual site tonnage (tonnes/year):	1.7e2
Maximum daily site tonnage (kg/day):	4.6e2
Frequency and duration of use:	Continuous release.
Emission Days (days/year):	365
Environment factors not influenced by risk management:	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Technical conditions and measures at process level (source) to prevent release:	Common practices vary across sites thus conservative process release estimates used.
Technical on-site 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.
Treat air emission to provide a typical removal efficiency of (%):	Not applicable.
Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ³ (%):	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ³ (%):	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 on-site sewage treatment (%):	88.8
Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs (%):	88.8
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d):	2.3e3
Assumed on-site sewage treatment plant flow (m³/d):	2000
Conditions and measures related to external treatment of waste for disposal:	Combustion emissions limited by required exhaust emission controls. 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 from the substance is generated.
RCR - Air Compartment Driven:	2.67E-02
RCR - Water Compartment Driven:	1.71E-01

Section 3:: Exposure estimation

Exposure estimation and reference to its source - Environment

Exposure assessment (environment): The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure estimation and reference to its source - Workers

Exposure assessment (human): The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Section 4:: Guidance to check compliance with the exposure scenario

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.

Health

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



Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition	Mixture
Code	SBX2296
Product name	Residual Fuel Oil (Flashpoint > 100°C) - Blended

Section 1:: Title

Short title of the exposure scenario	Heavy Fuel Oil Formulation and (Re)packing of Substance - Industrial
List of use descriptors	Identified use name: Formulation and (re)packing of substances and mixtures Process Category: PROC01, PROC02, PROC03, PROC08a, PROC08b, PROC15 Sector of end use: SU03, SU10 Subsequent service life relevant for that use: No. Environmental Release Category: ERC02 Specific Environmental Release Category: ESVOC SpERC 2.2.v1

Processes and activities covered by the exposure scenario	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
Assessment Method	See Section 3

Section 2: Operational conditions and risk management measures

Section 2.1: Control of worker exposure

Product characteristics:

Physical state: Liquid, vapour pressure < 0.5 kPa at STP.

Concentration of substance in product: Covers percentage substance in the product up to 100% (unless stated differently).

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Assumes a good basic standard of occupational hygiene is implemented.

Contributing scenarios: Operational conditions and 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 its use is identified for certain contributing scenarios; 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 chemical-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 operation for more than 4 hours. Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

Bulk product storage: Store substance within a closed system. Avoid carrying out operation for more than 4 hours. Wear chemical-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 chemical-resistant gloves (tested to EN374) in combination with 'basic'

Residual Fuel Oil (Flashpoint > 100°C) - Blended

Heavy Fuel Oil Formulation and (Re)packing of Substance - Industrial

employee training.

Laboratory activities: Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. Wear suitable gloves tested to EN374.

marine vessel/barge (un)loading: Transfer via enclosed lines. Avoid carrying out operation for more than 4 hours. Clear transfer lines prior to de-coupling. Retain drain-downs in sealed storage pending disposal or for subsequent recycle. Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

road tanker/rail car loading: Ensure material transfers are under containment or extract ventilation. Wear chemical-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 chemical-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 chemical-resistant gloves (tested to EN374) in combination with specific activity training. Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

Section 2.2:: Control of environmental exposure

Product characteristics: Substance is complex UVCB Predominantly hydrophobic

Amounts used:

Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.1e7
Fraction of Regional tonnage used locally:	2.6e-3
Annual site tonnage (tonnes/year):	3.0e4
Maximum daily site tonnage (kg/day):	1.0e5

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environment factors not influenced by risk management:

Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Release fraction to air from process (initial release prior to RMM):	2.2e-3
Release fraction to soil from process (initial release prior to RMM):	0.0001
Release fraction to wastewater from process (initial release prior to RMM):	5.0e-6

Technical conditions and measures at process level (source) to prevent release: Common practices vary across sites thus conservative process release estimates used.

Technical on-site 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 on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ³ (%): 54.0

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ³ (%): 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 on-site sewage treatment (%): 88.8

Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs (%): 88.8

Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d):	1.1e5
Assumed on-site sewage treatment plant flow (m³/d):	2000
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
RCR - Air Compartment Driven:	7.19E-01
RCR - Water Compartment Driven:	2.43E-01

Section 3:: Exposure estimation

Exposure estimation and reference to its source - Environment	
Exposure assessment (environment):	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Exposure estimation and reference to its source - Workers	
Exposure assessment (human):	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Section 4:: Guidance to check compliance with the exposure scenario

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