HELLENIC PETROLEUM

Extended Safety Data Sheet
according to 1907/2006/EC, Article 31

Version number 1.0 *25.11.2019*

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

· ***1.1 Product identifier***

· ***Trade name: MAZOUT RMG 380 0.5%S***

· ***Main constituent:*** Residues (petroleum), topping plant, low-sulfur
· ***CAS Number:***
68607-30-7
· ***EC number:***
271-763-7
· ***Registration number*** 01-2119486664-25-xxxx

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

· ***INDUSTRIAL USES***
(1) Manufacture of substance.
(2) Formulation and (re)packaging of substances and mixtures.
(3) Use of substance as intermediate.
(4) Distribution of substance.
(5) Use as a fuel.

· ***PROFESSIONAL USES***
(6) Use as a fuel.

· ***CONSUMER USES*** None

· ***Uses advised against*** Identified uses of the product are given above. Other uses are not supported.

· ***1.3 Details of the supplier of the safety data sheet***
· ***Manufacturer/Supplier:***
HELLENIC PETROLEUM S.A.
8A, Chimarras Str, 151 25, Maroussi, Greece
Tel. +30 210 6302 000
Fax. +30 210 6302 510/511
· ***Further information obtainable from:*** reach@helpe.gr

· ***1.4 Emergency telephone number:***

National Emergency Centre: 166
National Poison Centre: (+30) 210 7793777

SECTION 2: Hazards identification

· ***2.1 Classification of the substance or mixture***

· ***2.1.1 Classification according to Regulation (EC) No 1272/2008***

Acute Tox. 4	H332	Harmful if inhaled.
Carc. 1B	H350	May cause cancer.
Repr. 2	H361d	Suspected of damaging the unborn child.
STOT RE 2	H373	May cause damage to the liver, the blood tissue and the thymus through prolonged or repeated exposure.
Aquatic Acute 1	H400	Very toxic to aquatic life. (M= 1)
Aquatic Chronic 1	H410	Very toxic to aquatic life with long lasting effects. (M= 1)

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· ***2.1.2 Remarks***
For full text of Hazard statements also refer to section 16.

· ***2.2 Label elements***
· ***Labelling according to Regulation (EC) No 1272/2008***
The substance is classified and labelled according to the CLP regulation.
· ***Hazard pictograms***

GHS07 GHS08 GHS09

· ***Signal word*** Danger

· ***Hazard statements***
H332 Harmful if inhaled.
H350 May cause cancer.
H361d Suspected of damaging the unborn child.
H373 May cause damage to the liver, the blood tissue and the thymus through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

· ***Precautionary statements***

P201 Obtain special instructions before use.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313 IF exposed or concerned: Get medical advice/attention.

· ***Additional labelling requirements (CLP supplemental hazard statement):***
EUH066 Repeated exposure may cause skin dryness or cracking.
(Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B).

· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
Anthracene is not present in this substance at greater than 0.1% w/w.
· ***PBT:*** The substance does not meet the criteria for PBT in accordance with REACH Annex XIII.
· ***vPvB:*** The substance does not meet the criteria for vPvB in accordance with REACH Annex XIII.

SECTION 3: Composition/information on ingredients

· ***3.1 Chemical characterisation: Substances***
Description:
A low-sulfur complex combination of hydrocarbons produced as the residual fraction from the topping plant distillation of crude oil. It is the residuum after the straight-run gasoline cut, kerosene cut and gas oil cut have been removed.
· ***Concentration (%w/w):*** 100
· ***Identification number(s)***

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· ***CAS No. name***
68607-30-7 Residues (petroleum), topping plant, low-sulfur
· ***EC number:*** 271-763-7
· ***Registration number:*** 01-2119486664-25-xxxx
· ***Classification according to Regulation (EC) No. 1272/2008***
Acute Tox. 4; H332
Carc. 1B; H350
Repr. 2; H361d
STOT Rep. Exp. 2; H373. Affected organs: Blood, thymus, liver
Aquatic Acute 1; H400 (M=1)
Aquatic Chronic 1; H410 (M=1)

· ***Impurities and stabilising additives:*** None.

· ***Substances included in the candidate list of Substances of Very High Concern (SVHC):*** None

· ***Additional information:***
Substance "Residues (petroleum), topping plant, low-sulfur" is a UVCB substance and member of the CONCAWE category “Heavy Fuel Oil Components”.
For full text of Hazard statements also refer to section 16.

SECTION 4: First aid measures

· ***4.1 Description of first aid measures***

· ***General information:***
Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces.
Wear appropriate personal protective equipment to protect against hot product.
· ***Following inhalation:***
If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
If casualty is unconscious and:
(1) Not breathing – ensure that there is no obstruction to breathing and give artificial respiration by trained personnel. If necessary, give external cardiac massage and obtain medical assistance.
(2) Breathing – place in the recovery position. Administer oxygen if necessary.
Obtain medical assistance if breathing remains difficult.
(Subject to applicability) If there is any suspicion of inhalation of H2S (hydrogen sulphide):
(1) Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.
(2) Remove casualty to fresh air and keep at rest in a position comfortable for breathing.
(3) Immediately begin artificial respiration if breathing has ceased.
(4) Provision of oxygen may help.
(5) Obtain medical advice for further treatment.
· ***Following skin contact:***
Immediately remove contaminated clothes.
Immediately wash with water and soap and rinse thoroughly.
NEVER use gasoline, kerosene or other solvents for washing of contaminated skin.
Seek medical attention if skin irritation, swelling or redness develops and persists.
When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention. Do not wait for symptoms to develop.
For minor thermal burns, cool the burn.
Hold the burned area under cold running water for at least five minutes, or until the pain subsides.
Body hypothermia must be avoided.
Do not put ice on the burn.

Remove non-sticking garments carefully.
DO NOT attempt to remove portions of clothing glued to burnt skin but cut round them.
Seek medical attention in all cases of serious burns.

· ***Following eye contact:***
Rinse opened eye for several minutes under running water.
Remove contact lenses, if possible.
If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.
If hot product is splashed into the eye, it should be cooled down immediately to dissipate heat, under cold running water. Immediately obtain specialist medical assessment and treatment for the casualty.

· ***Following ingestion/aspiration:***
Do not induce vomiting; call for medical help immediately.
Seek immediate medical advice.
Do not give anything by mouth to an unconscious person.

· ***4.2 Most important symptoms and effects, both acute and delayed***
INHALATION
Irritation of the respiratory tract due to excess fume mists or vapour exposure
SKIN CONTACT
Dry skin
Irritation of skin, in case of repeated or prolonged exposure
EYE CONTACT
Slight eye irritation
Exposure to high concentrations may cause asphyxiation.
INGESTION
Few or no symptoms expected. If any, nausea and diarrhoea might occur.

· ***Notes for the doctor:***
If there is any suspicion of over exposure to H2S (hydrogen sulphide) the casualty must be treated for poisoning.
Individuals with pre-existing lung disorders may have increased susceptibility of the effects of exposure.
High-pressure injection may drive fluid into the skin even through gloves or overalls. Diagnostic examination (e.g. radiographic or ultrasound) of the affected area may help to determine the distance of spread from the injection site. Primary treatment consists of surgical decompression and debridement.

· ***Hazards*** May cause burn in case of contact with product at high temperature

· ***4.3 Indication of any immediate medical attention and special treatment needed***
Treat accordingly depending on the type of exposure.

SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***

· ***Suitable extinguishing media:***
Foam (specifically trained personnel only)
Water fog (specifically trained personnel only)
Dry chemical powder
Carbon dioxide
Other inert gases (subject to regulations)
Sand or earth

· ***Unsuitable extinguishing media:***
Do not use direct water jets on the burning product.

Simultaneous use of foam and water on the same surface is to be avoided.

· ***5.2 Special hazards arising from the substance or mixture***
This product will float and can be reignited on surface water.
· ***Hazardous combustion products:***
Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide, H2S, SOx (sulfur oxides) or sulfuric acid and unidentified organic and inorganic compounds.

· ***5.3 Advice for fire-fighters***
· ***Other protective equipment for fire-fighters:***
In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

· ***Specific fire-fighting methods:*** None available.

SECTION 6: Accidental release measures

· ***GENERAL INFORMATION***
Avoid contact with the product.
Stay upwind.
In case of large spillages, alert occupants in downwind areas.
Keep non-involved personnel away from the area of spillage. Alert emergency personnel.
Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.
Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares).
When the presence of dangerous amounts of H2S around the spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training.
If required, notify relevant authorities according to all applicable regulations.

· ***6.1 Personal precautions, protective equipment and emergency procedures***
For Personal Protective Equipment refer to Section 8.

· ***6.1.1 For non-emergency personnel***
Ensure adequate ventilation.
Evacuate danger area and consult an expert.

· ***6.1.2 For emergency responders***
Small spillages: Normal antistatic working clothes are usually adequate.
Large spillages:
Full body suit of chemically resistant and antistatic material.
Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons. Gloves made of PVA are not water-resistant, and are not suitable for emergency use.
PERSONAL PROTECTIVE EQUIPMENT
ATTENTION! Gloves made of PVA are not water-resistant, and are not suitable for emergency use.
If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated.
Work helmet.
Wear antistatic non-skid safety shoes or boots, if necessary, heat resistant.

Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated.
A half or full-face respirator with filter(s) for organic vapours/H2S, or a Self-contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

· ***6.2 Environmental precautions***
Avoid release to the environment.
SPILLAGES ON TO LAND
Do not allow product to reach sewage system or any water course.
When inside buildings or confined spaces, ensure adequate ventilation.
Stop or contain leak at the source, if safe to do so.
Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary.
Local regulations may also prescribe or limit actions to be taken.

· ***6.3 Methods and material for containment and cleaning up***
Dispose contaminated material as waste according to item 13.

· ***6.3.1 For containment***
SPILLAGES ON TO LAND
If necessary dike the product with dry earth, sand or similar non-combustible materials.
SPILLAGES IN WATER OR AT SEA
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.

· ***6.3.2 For cleaning up***
SPILLAGES ON TO LAND
Let hot product cool down naturally.
Large spillages may be cautiously covered with foam, if available, to limit fire risk.
Do not use direct jets.
Absorb spilled product with suitable non-combustible materials.
Transfer collected product to suitable containers for recovery or safe disposal.
In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.
SPILLAGES IN WATER OR AT SEA
The use of dispersants should be advised by an expert, and, if required, approved by local authorities.
Collect recovered product and other materials in suitable tanks or containers for recovery or safe disposal.
The solid product is denser than water and will slowly 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, or burying the product with sand may be a feasible option.

· ***6.3.3 Other information***
Concentration of H2S in tank headspaces may reach hazardous values, especially in case of prolonged storage.
This situation is especially relevant for those operations which involve direct exposure to the vapours in the tank.
Spillages of limited amounts of product, especially in the open air when vapours will be usually quickly dispersed, are dynamic situations, which will presumably limit the exposure to dangerous concentrations.
As H2S has a density greater than ambient air, a possible exception may regard the build-up of dangerous concentrations in specific spots, like trenches, depressions or confined spaces.
In all these circumstances, however, the correct actions should be assessed on a case-by-case basis.

· ***6.4 Reference to other sections***
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Obtain special instructions before use.
Ensure that all relevant regulations regarding handling and storage facilities are followed.
A specific assessment of inhalation risks from the presence of H2S in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases must be made to help determine controls appropriate to local circumstances.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

· ***7.1.1 Protective measures***
Take precautionary measures against static electricity.
Ground/bond containers, tanks and transfer/receiving equipment.
Do not breathe fume/ mist/ vapours.
Avoid prolonged or repeated contact with skin.
Precautions should be taken to avoid skin burns when handling hot product.
Use personal protective equipment as required.
For more information regarding protective equipment and operational conditions refer to the Exposure Scenarios.

· ***Measures to protect the environment:*** Not available.

· ***7.1.2 Advice on general occupational hygiene***
Ensure that proper housekeeping measures are in place.
Contaminated materials should not be allowed to accumulate in the workplaces and should never be kept inside the pockets.
Keep away from food and beverages.
Do not eat, drink or smoke while using the product.
Wash your hands thoroughly after handling.
Change contaminated clothes at the end of working shift.

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· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Technical measures and storage conditions:***
Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.
Cleaning, inspection and maintenance of internal structure of storage equipments must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.
Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulphide (H2S) and flammability.
- Recommended: For containers, or container linings use mild steel, stainless steel.
- Unsuitable materials: Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.
· ***Information about storage in one common storage facility:*** Store separately from oxidising agents.
· ***Further information about storage conditions:***
IF THE PRODUCT IS SUPPLIED IN CONTAINERS:
Keep only in the original container, or in a suitable container for this kind of product.
Store receptacle in a well ventilated area.
Keep containers tightly closed and properly labelled.
Empty containers may contain flammable product residues.
Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.
· ***Storage class:*** 3

· ***7.3 Specific end use(s)*** Refer to Exposure Scenarios, attached as Annex.

SECTION 8: Exposure controls/personal protection

· ***8.1 Control parameters***
In any case, it is advisable to reduce occupational exposure to mist or vapour to a minimum.

· ***8.1.1 Occupational Exposure /Biological Limit Values***
Substance is not included in the lists of European Directives 91/322/EEC, 98/24/EC, 2000/39/EC, 2006/15/EC, 2009/161/EU.
There are no recommended Threshold Limit Values (TLVs) by ACGIH.
Biological Limit Values (BLVs) are not allocated.
· ***Ingredients with biological limit values:***
Urinary biomarkers of exposure to PAHs may provide an indication of exposure to the substance.

· ***8.1.2 Information on currently recommended monitoring procedures***
EN 1127-1:2011
EN 60079-0:2012
EN 14042:2003

· ***8.1.3 Applicable occupational exposure limit values and/or biological limit values for air contaminants (if formed when using the substance/mixture as intended)***
HYDROGEN SULFIDE (CAS No. 7783-06-4)

GR (GREECE)	TWA: 7mg/m³, 5ppm,	STEL: 14mg/m³, 10ppm
EU	TWA: 7mg/m³, 5ppm,	STEL: 14mg/m³, 10ppm
USA/ACGIH	TWA: 1ppm,	STEL: 5ppm

OSHA, 1910, Subpart: Z-2
Acceptable ceiling concentration: 20ppm

Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift: 50ppm, Maximum duration: 10 min once only, if no other exposure occurs.

· ***8.1.4 DNEL/PNEC values***

· ***DNELs:***		
Oral	DN(M)EL - Chronic effects systemic	0.015 mg/kg/24h (GENERAL POPULATION) Starting point = 1.1mg/kg/day
Dermal	DN(M)EL - Chronic effects systemic	0.065 mg/kg (WORKERS) Starting point : LOAEL= 1mg/kg/day
Inhalation	DN(M)EL - Acute effect systemic	4,716.8 mg/m3 (WORKERS) Starting point = NOAEC= 3300 mg/m^3
	DN(M)EL - Chronic effects local	0.18 mg/m3 (WORKERS) Starting point = LOAEL= 1mg/kg/day

· ***Justification for (no) DN(M)EL derivation***
WORKERS:
- Acute exposure (dermal):
Local effect: No hazard identified for this route (data available).
Systemic effect: No hazard identified for this route (data available).
- Acute exposure (inhalation):
Local effect: No hazard identified for this route (data available).
- Long-term exposure (dermal):
Local effect, for 13 weeks exposure: No hazard identified for this route (data available).
Local effect, for chronic exposures: No threshold effect and/or no dose-response info available.
- Long-term exposure (inhalation):
No hazard identified for this route (data available).
GENERAL POPULATION:
- Acute Exposure - Systemic Effect - Dermal/Inhalation:
No hazard identified for this route (data available).
- Acute Exposure - Local Effect - Dermal/Inhalation:
No hazard identified for this route (data available).
- Long-term Exposure - Systemic Effect - Dermal/Inhalation:
No hazard identified for this route (data available).
- Long-term Exposure - Local Effect - Dermal/Inhalation:
No hazard identified for this route (data available).

· ***Justification for (no) PNEC derivation***
Substance is a hydrocarbon UVCB (with a complex, unknown or variable composition).Therefore conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances.
The hazard assessment conclusion for secodary posoining (PNEC oral) is 66.7 mg/kg food.

· ***8.2 Exposure controls***
There is no risk of inhalation at ambient temperatures because product volatility is low.
Exposure limited to tank filling and maintanance operations.

· ***8.2.1 Appropriate engineering controls / Technical measures to prevent exposure***
Minimise exposure to fumes.
Effective local ventilation must be provided.

Storage and handling temperatures should be kept as low as feasible to minimize fume production.
Product is stored and handled in closed systems involving the use of insulated storage tanks and lagged and trace heated transfer lines.
Cleaning, inspection and maintenance of storage tanks require the implementation of strict confined space entry procedures. These include issuing of permits, gas freeing of tanks.
Do not enter empty storage tanks until measurements of available oxygen and hydrogen sulphide concentration and have been carried out.

· ***Organisational measures to prevent exposure:***
Before a worker is placed in a job with a potential for exposure to the substance, a licensed health care professional should evaluate and document the worker's baseline health status.

· ***8.2.2 Personal Protective Equipment***

· ***Respiratory protection:***

Self-contained breathing apparatus (SCBA).

In spaces where hydrogen sulphide may accumulate and/or oxygen deficiency is possible:

Face mask with suitable cartridge .

Filter B (DIN EN 529)
If exposure levels cannot be evaluated with adequate confidence:

Self-contained breathing apparatus (SCBA).

· ***Protection of hands:***

Protective gloves (EN 374, EN 407)

If repeated and/or prolonged skin exposure is likely, wear:
Long cuffed gloves
Provide employee skin care programmes.
Gloves must be periodically inspected and changed in case of wear, perforations or contaminations.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the gloves material on consideration of the penetration times, rates of diffusion and the degradation.

· ***Material of gloves***
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· ***Not suitable are gloves made of the following materials:*** PVA gloves.

· ***Eye protection:***
If splashing is likely, wear:

Protective shield and/or Safety goggles (EN 166)

· ***Body protection:***

Protective work clothing

DIN EN 340, BS EN 465:1995, BS EN 466-1:1995, BS EN 467:1995, DIN EN 943-1, DIN EN 13034, DIN EN 14605
Coveralls should be changed at the end of the work shift and cleaned as necessary to avoid transfer of product to clothes or underwear.
For loading/unloading operations:

Safety helmet with integrated full face visor and neck protection

DIN EN 397

· ***8.2.3 Environmental exposure controls***
Sludge should be incinerated, contained or reclaimed.
Onsite waste water treatment required.
· ***Risk management measures***
An Emergency Response Plan must be available on site, in order to minimise potential environmental damage, in case of spill.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***

· ***General Information***	
· ***Appearance:***	
Form:	Viscous liquid
Colour:	Not determined.
· ***Odour:***	Characteristic
· ***Odour threshold:***	Not determined
· ***pH-value:***	Not determined.
· ***Change in condition***	
Melting point/freezing point:	<30 °C
Initial boiling point and boiling range:	381-545 °C
· ***Flash point:***	min 60 °C
· ***Flammability (solid, gas):***	Not applicable

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· **Decomposition temperature:**	Not determined.
· **Explosive properties:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	The substance is not explosive.
Upper:	The substance is not explosive.
· **Vapour pressure at 120 °C :**	0.2-7.91 hPa
· **Density:**	max. 0.991 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Not determined (UVCB)
· **Partition coefficient: n-octanol/water:**	Not determined (UVCB)
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic at 50 °C :	max 380 cSt
· **9.2 Other information**	Does not meet the criteria for corrosion of metal. Does not meet the definition of a peroxide.

SECTION 10: Stability and reactivity

· **10.1 Reactivity**
Not self-reactive.
Does not undergo exothermic decomposition when heated.
Does not react with water.

· **10.2 Chemical stability** Stable under normal conditions of use.
· **Conditions to avoid** No decomposition if used according to specifications.

· **10.3 Possibility of hazardous reactions** No dangerous reactions known.

· **10.4 Conditions to avoid**
Extremely high temperatures.
Heat sources, sparks, open flames and ignition sources.

· **10.5 Incompatible materials**
Halogens
Strong acids
Strong oxidising agents
Alkaline substances.

· **10.6 Hazardous decomposition products**
Hazardous products of thermal cracking: Carbon monoxide and dioxide, nitrogen oxides, sulfur dioxide, hydrogen sulfide, unburned hydrocarbons, polynuclear aromatic hydrocarbons, particulates.
Ash from product burning may contain metal oxides.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
Information below, applies to all category members.

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· ***A) Acute toxicity:***		
Oral	LD50	5270 (m), 4320 (f) mg/kg bw (rat) ((Equivalent) OECD 401) Route of exposure: oral: gavage Test material: 64741-62-4 m (male), f (female)
Dermal	LD50	>2,000 mg/kg bw (rabbit) ((Equivalent) OECD 434) Coverage: occlusive Test material: 64741-62-4 >2,000 mg/kg bw (rabbit) ((Equivalent) EU Method B.3) Coverage: occlusive Test material: 68476-33-5
Inhalation	LC50	4,100 (m), 4500 (f) mg/m3 air (rat) ((Equivalent) EPA OTS798.1150) LC50 (4h) Route of exposure: inhalation: aerosol (whole body) Test material: 64741-62-4 m (male), f (female)

Based on the availble data HFOs are classified Acute Tox. 4;H332

· ***B) Skin corrosion/irritation:***
Skin irritation potential has been investigated in a large number of studies using open or occluded skin contact and exposure periods of 4h-24h. Dermal responses were recorded using Draize criteria. Conditions used deviate from those of Annex V method B.4 test, for most of the studies. The results indicate that members of this category are no more than moderately irritating to skin.

· ***C) Serious eye damage/irritation:***
Eye irritation potential has been investigated in a large number of studies (GLP-compliant). Ocular responses were recorded using Draize criteria. Conditions used do not deviate from those of Annex V method B.5. The results indicate that members of this category are non-irritating to the eye (transient, fully reversible eye irritation).

· ***D) Respiratory or skin sensitisation:***
Skin sensitisation potential has been investigated in a large number of studies, in guinea pigs, using closed patch technique. Dermal responses were recorded using Draize criteria. Conditions used do not deviate from those of Annex V method B.6 and Buehler method. The results indicate that memebers of this category are not skin sensitisers.
No studies available for respiratory sensitisation.
Respiratory sensitisation is not a REACH requirement.

· ***E) Germ cell mutagenicity (Genetic toxicity in vitro/in vivo)***
There is no consistent evidence of mutagenic activity in a range of in vitro and in vivo assays.

· ***F) Carcinogenicity***
Results obtained from using the modified Ames test, from mouse skin painting tests and initiation/ promotion assay along with chemical (PAH) analysis indicate that the substance is carcinogenic.

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· **G) Toxicity to reproduction**		
Dermal	NOAEL (maternal toxicity)	333 mg/kg bw/day (rat) Route of administration: dermal Concentration: 0, 50, 333, 1000mg/kg bw/day Duration of exposure: 6hrs/day Test material: 64741-45-3
		0.05 mg/kg bw/day (rat) (EPA OTS 798.4900) Route of administration: dermal Concentration: 0, 0.05, 1, 10, 50, 250mg/kg bw/day Duration of exposure: 6hrs/day
	NOAEL (developmental toxicity)	333 mg/kg bw/day (rat) Route of administration: dermal Concentration: 0, 50, 333, 1000mg/kg bw/day Duration of exposure: 6hrs/day Test material: 64741-45-3
		0.05 mg/kg bw/day (rat) (EPA OTS 798.4900) Route of administration: dermal Concentration: 0, 0.05, 1, 10, 50, 250mg/kg bw/day Duration of exposure: 6hrs/day
	NOAEL (systemic toxicity)	50 (m), 250 (f) mg/kg bw/day (rat) (EPA OTS 798.4700) Concentrations: 0, 0.1, 1, 10, 50, 250mg/kg bw/day (nominal) Duration of exposure: 6hrs/day, daily for 70 days (male) Duration of exposure: 6hrs/day, daily for 21 days (female) Test material: 64741-62-4 m (male), f (female)
	NOAEL (reproduction)	250 mg/kg bw/day (rat) (EPA OTS 798.4700) Concentrations: 0, 0.1, 1, 10, 50, 250mg/kg bw/day (nominal) Duration of exposure: 6hrs/day, daily for 70 days (male) Duration of exposure: 6hrs/day, daily for 21 days (female) Test material: 64741-62-4 m (male), f (female)

· ***H) STOT single exposure***
No evidence of systemic toxicity.

· ***I) STOT repeated exposure***
There is evidence to indicate that Heavy Fuel Oil Components have a potential to cause systemic alterations following repeated dermal exposure.

· ***J) Aspiration hazard:***
Does not meet the criteria for aspiration hazard as the kinematic viscosity is more than 20.5 mm^2/s at 40 ^0C.

SECTION 12: Ecological information

· ***12.1 Toxicity***
Information below, applies to all category members.

· ***12.1.1 Aquatic toxicity***	
NOEL/28d	0.1 mg/L (FISH/Oncorhynchus mykiss) (QSAR/PETROTOX)
EL0/48h	0.05 mg/L (INVERTEBRATES/Daphnia magna) (OECD 202)
EL100/48h	1.35 mg/L (INVERTEBRATES/Daphnia magna) (OECD 202)

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NOEL/21d	0.27 mg/L (INVERTEBRATES/Daphnia magna) (QSAR/PETROTOX)
EL50/72h	0.32 mg/L (FRESH WATER ALGAE) (OECD 201)
LL50/96h	79 mg/L (FISH/Oncorhynchus mykiss) (OECD 203)
NOELR	0.05 mg/L (FRESH WATER ALGAE) (OECD 201 (72h))
EL50	0.22 mg/L (INVERTEBRATES/Daphnia magna) (OECD 202 (48h))
	2.56 mg/L (INVERTEBRATES/Daphnia magna) (OECD 202 (24h))

· ***12.1.2 Sediment toxicity***
Substance is complex (UVCB). Standard tests for sediment toxicity cannot be applied.

· ***12.1.3 Terrestrial toxicity***
Substance is complex (UVCB). Standard tests for terrestrialt toxicity cannot be applied.
Toxicity to birds:

NOAEL	20,000 mg/kg (Anas platyrhynchos) (OECD 206) Concentrations: 0, 200, 2000, 20000mg/kg Duration of exposure: 22 weeks Test material: North Slope crude oil (WEVC)

· ***12.2 Persistence and degradability***

· ***12.2.1 Persistence Assessment***
An evaluation of representative hydrocarbon structures, indicate some structures meet the Persistent (P) or very Persistent (vP) criteria.

· ***12.2.2 Stability***
-- Hydrolysis:
Hydrolysis to the environment is not expected due to lack of hydrolysable functional groups. Testing does not need to be conducted.
-- Phototransformation in water/soil:
It does not have the potential to undergo photolysis in water and soil, and this fate process will not contribute to a measurable degradative loss of this substance from the environment.
-- Phototransformation in air:
Substance is complex (UVCB). Standard tests for atmospheric oxidation half-lives cannot be applied.

· ***12.2.3 Biodegradation***
Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

· ***12.3 Bioaccumulative potential***
An evaluation of representative hydrocarbon structures indicated that no structures meet the very bioaccumulative criterion but some structures meet the bioaccumulative criterion.

· ***12.4 Mobility in soil*** No further relevant information available.

· ***12.5 Results of PBT and vPvB assessment***
Anthracene is not present in this substance at greater than 0.1% w/w.
· ***PBT:*** Substance does not fulfil the criteria of REACH Annex XIII for PBT/vPvB.
· ***vPvB:*** Substance does not fulfil the criteria of REACH Annex XIII for PBT/vPvB.

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· **12.6 Other adverse effects**
Emission characterization is not required because the substance does not fulfill the PBT/vPvB criteria.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**

· **13.1.1 Product / Packaging disposal**
When it is required to dispose of this product - for example following a spillage or tank cleaning operations - this should be done through a recognised waste contractor.

· **Waste disposal key:**
These codes can be given only as a suggestion, according to the original composition of the product, and its intended (foreseeable) use(s). The final user has the responsibility for the attribution of the most suitable code, according to the actual use(s) of the material, contaminations or alterations.

· **European waste catalogue**	
13 00 00	OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)
13 07 00	wastes of liquid fuels
13 07 01*	fuel oil and diesel

· **13.1.2 Waste treatment - relevant information**
Do not apply industrial sludge to natural soils. Dispose according to local regulations.

· **13.1.3 Sewage disposal - relevant information** Prevent from entering sewers.

· **13.1.4 Other disposal recommendations**
Disposal of waste is seldom necessary due to its primary use as combustion fuel.
The waste generator is responsible for the determination of the waste classification and disposal methods according to local regulations.

· **13.2 Additional information**
Not available.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, ADN, IMDG, IATA**	UN3256
· **14.2 UN proper shipping name**	
· **ADR/RID**	3256 ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. , with flashpoint above 60 ° C, at or above its flashpoint and below 100 ° C.
· **AND(R)**	3256 ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flashpoint above 60 ° C, at or above its flashpoint and below 100 ° C.
· **IMDG Code**	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S., MARINE POLLUTANT
· **ICAO-TI/IATA-DGR**	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.

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· **14.3 Transport hazard class(es)**

· **ADR/RID**

· **Class**	3 Flammable liquids.
· **Label**	3
· **AND(R)**	
· **ADN/R Class:**	3
· **14.4 Packing group**	
· **ADR/RID, AND(R)**	III
· **Packing Instructions:**	P099, IBC99
· **Special packing provisions:**	None
· **Mixed packing provisions:**	MP2
· **Portable Tanks and Bulk Containers:**	T3, TP3, TP29
· **14.5 Environmental Hazards**	
· **IMDG Code Environmental Hazards: Marine pollutant:**	P
· **Special marking (ADR/RID):**	Symbol (fish and tree)
· **14.6 Special precautions for user**	Warning: Flammable liquids.
· **EmS Number:**	F-E,S-D
· **Remarks**	A
· **14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:**	Not applicable. MARPOL Annex I rules apply for bulk shipments by sea.
· **Transport/Additional information:**	ALTERNATIVE UN NUMBERS FOR TRANSPORTATION -- UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. These designations are used for substances and mixtures which are dangerous to the aquatic environment that do not meet the classification criteria of any other class or another substance within Class 9. Special provisions: 274, 335, 275, 601. -- For transport in tank vessels, a different UN number and proper shipping name will be required if the criteria for classification as AND ID 9001 are met. -- For transport in tank vessels, a different UN number and proper shipping name will be required if the criteria for classification as AND ID 9003 are met.

· ***ADR Special provisions***	-- UN 3256: 274, 560
· ***Remarks:***	-- ADN(R) will only applied until end 2010 and from 1.1.2011 ADN annexed regulations (ADN 2011) entered into force also on the Rhine.
· ***Tunnel restriction code***	D/E
· ***Limited quantities (LQ)***	0
· ***Excepted quantities (EQ)***	E0

SECTION 15: Regulatory information

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

· ***National Regulations***

- Joint Ministerial Decision No. 284/2006 - Adaptation of Greek legislation to the Council Directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC and to the Directive 2005/33/EC of the European Parliament and of the Council amending Directive 1999/32/EC as regards the sulphur content of marine fuels (Government Gazette Issue 1736B, 2007).
- Decision nr. 51/2008 of the Supreme Chemical Council: "Repeal of the nr 2608/82 decision and amendment of the decision nr 42/1994 " Specifications and standard test methods for heavy fuel oil" Goverment Gazette 1260B/2008.

· ***European regulations***

- Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (Text with EEA relevance).

- Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (SEVESO III).
- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
- Directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.

· ***15.2 Chemical safety assessment:*** A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

· ***A) Indication of changes***

First version of the extended Safety Data Sheet for «MAZOUT RMG 380 0.5%S» in compliance with the Commission Regulation (EU) 830/2015.

· ***B) Abbreviations and acronyms:***

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent

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LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity – Hazard Category 4
Carc. 1B: Carcinogenicity – Hazard Category 1B
Repr. 2: Reproductive toxicity – Hazard Category 2
STOT RE 2: Specific target organ toxicity- Repeated exposure, Hazard Category 2
Aquatic Acute 1:Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Chronic 1: Hazardous to the aquatic environment — Chronic Hazard, Category 1

· ***Additional abbreviations and acronyms***
AF: Assessment Factor
CLP: Classification, Labelling and Packaging
CONCAWE: CONservation of Clean Air and Water Europe
DNEL: Derived No Effect Level
DMEL: Derived Minimal Effect Level
ECHA: European Chemicals Agency
ES: Exposure Scenario
LOAEL: Lowest Observed Adverse Effect Level
NOEL: No Observed Effect Level
NOELR: No Observed Effect Loading Rate
NOAEL: No Observed Adverse Effect Level
NOAEC :No Observed Adverse Effect Concentration
OECD: Organisation for Economic Co-Operation and Development
PNEC: Predicted No Effect Concentration
STOT: Specific Target Organ Toxicity
STP: Sewage Treatment Plant
SVHC: Substance of Very High Concern
TWA: Time-Weighted-Average
UVCB: Unknown or Variable composition, Complex reaction products or Biological materials

· ***C) Key literature references and sources of data***
CONCAWE Report 6/10 “Compilation of selected physical-chemical properties of petroleum substances and sulfur”
CONCAWE REPORT 13/17 “Hazard Classification and Labelling of Petroleum Substances in the EEA – 2017”.
OSHA, Occupational Safety & Health Administration, http://www.osha.gov

· ***D) Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]***
According to CLP criteria.
Acute Tox. 4; H332
Carc. 1B; H350
Repr. 2; H361d
STOT Rep. Exp. 2; H373 Affected organs: Blood, thymus, liver
Aquatic Acute 1; H400 (M=1)
Aquatic Chronic 1; H410 (M=1)

· ***E) Relevant H-statements (number and full text)***
H332: Harmful if inhaled.
H350: May cause cancer.
H361d: Suspected of damaging the unborn child.
H373: May cause damage to the liver, the blood tissue and the thymus through prolonged or repeated exposure.
H400: Very toxic to aquatic life (M=1).
H410: Very toxic to aquatic life with long lasting effects (M=1).
EUH066: Repeated exposure may cause skin dryness or cracking.

· ***F) Training advice*** The information of the present document may be used for training purposes.

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· ***G) Further information***
DISCLAIMER OF LIABILITY
The information provided only concerns the specific product and may not apply for the same material if used in combination with any other material(s) or in any process. This information is accurate and reliable according to data which Hellenic Petroleum SA has available on the above date and is given in good faith but without any warranty. The present e-SDS is supplied to customers, for them to consider and judge that the information is appropriate and complete for their particular use of the product. It is their own obligation to pass on relevant exposure scenarios and to use the relevant information to compile their own e-SDSs.

EXPOSURE SCENARIO 1 of 6

Worker in Industrial Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE	
Title	**Manufacture of substance**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent
Environmental Release Category (ERC)	
ERC1	Manufacture of the substance
Specific Environmental Release Category (SpERC)	ESVOC SpERC 1.1v1
Processes, tasks, activities covered	Manufacture of the substance. Includes material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Assessment Method	See Section 3.

SECTION 2: OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1: Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Operation is carried out at elevated temperature (> 20°C abo ve ambient temperature) [OC7].
	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize 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 [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Process sampling [CS2]. + Outdoor [OC9].	Sample via a closed loop or other system to avoid exposure [E8] Avoid carrying out activities involving exposure for more than 15 minutes [OC26] Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]
Bulk product storage [CS85].	Store substance within a closed system [E84]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure [E12]. Wear suitable gloves tested to EN374 [PPE15].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Marine vessel/barge (un)loading [CS510].	Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Transfer via enclosed lines [E52]. Clear transfer lines prior to de-coupling [E39]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

Road tanker/Railcar loading [CS511].	Ensure material transfers are under containment or extract ventilation [E66]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Section 2.2: Control of environmental exposure	
Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	9,8E+04
Fraction of Regional tonnage used locally	1,0E+00
Annual site tonnage (tonnes/year)	9,8E+04
Maximum daily site tonnage (kg/day)	3,3E+05
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM):	1,00E-04
Release fraction to wastewater from process (initial release prior to RMM):	1,00E - 05
Release fraction to soil from process (initial release prior to RMM):	0,0001

Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b].	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].	
Treat air emission to provide the required removal efficiency of (%):	9,0 E + 01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	81,4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
[STP1] Not applicable as there is no release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	92,2
Assumed domestic sewage treatment plant flow (m3/d):	1,00E+04
Maximum allowable site tonnage (MSafe) (kg/d):	7,8 E + 05
Conditions and measures related to external treatment of waste for disposal	

During manufacturing no waste of the substance is generated [ETW4].
Conditions and measures related to external recovery of waste
During manufacturing no waste of the substance is generated [ERW2].

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].
Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].
Available hazard data do not support the need for a DNEL to be established for other health effects [G36].
Risk Management Measures are based on qualitative risk characterization. [G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].
Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.

Maximum Risk Characterization Ratio for Air Emissions RCRair	6,4E - 02
Maximum Risk Characterization Ratio for Wastewater Emissions RCRwater	4,2E - 01

EXPOSURE SCENARIO 2 of 6

Worker in Industrial Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE	
Title	**Formulation & (re)packing of substances and mixtures**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent
Environmental Release Category (ERC)	
ERC2	Formulation into mixture
Specific Environmental Release Category (SpERC)	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tablettting, compression, pelletization, extrusion, large and small scale packing, 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 form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Assumes use at not more than 20oC above ambient temperatures, unless stated differently [G15].
	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize 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 [G20].
General exposures (closed systems) [CS15] + Process sampling [CS2].	Handle substance within a closed system [E47]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Avoid carrying out operation for more than 15 minutes [OC26]. Sample via a closed loop or other system to avoid exposure [E8].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Product sampling [CS137].	Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out activities involving exposure for more than 15 minutes [OC26]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Drum/batch transfers [CS8]	Ensure material transfers are under containment or extract ventilation [E66]. Provide a general ventilation (not less than 3 to 5 air changes per hour) [E11] or [G9]; Ensure operation is undertaken outdoors [E69]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

Bulk product storage [CS85].	Store substance within a closed system [E84]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure [E12]. Wear suitable gloves tested to EN374 [PPE15].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Marine vessel/barge (un)loading [CS510].	Transfer via enclosed lines [E52] Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Clear transfer lines prior to de-coupling [E39]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Road tanker/Railcar loading [CS511].	Ensure material transfers are under containment or extract ventilation [E66]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Section 2.2: Control of environmental exposure	
Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	2,1E+05
Fraction of Regional tonnage used locally	1,4E-01
Annual site tonnage (tonnes/year)	3,0E+04
Maximum daily site tonnage (kg/day)	1,0E+05
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:26.10.2018	10

Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	2,5E-03
Release fraction to wastewater from process (initial release prior to RMM)	5,0E-06
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j].	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].	
Treat air emission to provide the required removal efficiency of (%):	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	75,7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
[STP1] Not applicable as there is no release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	92,2
Assumed domestic sewage treatment plant flow (m3/d):	2,0E +03
Maximum allowable site tonnage (MSafe) (kg/d):	1,5E + 05

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. [ETW3]

Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].

Available hazard data do not support the need for a DNEL to be established for other health effects [G36].

Risk Management Measures are based on qualitative risk characterization. [G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].

Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.

Maximum Risk Characterization Ratio for Air Emissions RCRair	3,3E- 01
Maximum Risk Characterization Ratio for Wastewater Emissions RCRwater	3,2E- 01

EXPOSURE SCENARIO 3 of 6

Worker in Industrial Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE	
Title	**Use of substance as intermediate**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent
Environmental Release Category (ERC)	
ERC6A	Use of intermediate
Specific Environmental Release Category (SpERC)	ESVOC SpERC 6.1a.v1
Processes, tasks, activities covered	Use of substance as an intermediate. Includes material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Assessment Method	See Section 3.

SECTION 2: OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1: Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7].
	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize 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 [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
General exposures (closed systems) [CS15] + Process sampling [CS2] + Outdoor [OC9].	Handle substance within a closed system [E47]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out operation for more than 15 minutes [OC26].
Bulk product storage [CS85].	Store substance within a closed system [E84]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure [E12]. Wear suitable gloves tested to EN374 [PPE15].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Marine vessel/barge (un)loading [CS510].	Clear transfer lines prior to de-coupling [E39]. Transfer via enclosed lines [E52]. Avoid carrying out operation for more than 4 hours [OC28]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

Road tanker/Railcar loading [CS511].	Avoid carrying out operation for more than 1 hour [OC27]. , or [G9]: Ensure material transfers are under containment or extract ventilation [E66]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Section 2.2: Control of environmental exposure	
Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	1,6E+05
Fraction of Regional tonnage used locally	9,5E-02
Annual site tonnage (tonnes/year)	1,5E+04
Maximum daily site tonnage (kg/day)	5,0E+04
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM):	1,00E-05
Release fraction to wastewater from process (initial release prior to RMM):	1,00E-05

Release fraction to soil from process (initial release prior to RMM):	0,001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j].	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].	
Treat air emission to provide the required removal efficiency of (%):	8,0E + 01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	78,4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	92,2
Assumed domestic sewage treatment plant flow (m3/d):	2,00E+03

Maximum allowable site tonnage (MSafe) (kg/d):	1,4E + 05

Conditions and measures related to external treatment of waste for disposal

This substance is consumed during use and no waste of the substance is generated [ETW5].

Conditions and measures related to external recovery of waste

This substance is consumed during use and no waste of the substance is generated [ERW3].

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].

Available hazard data do not support the need for a DNEL to be established for other health effects [G36].

Risk Management Measures are based on qualitative risk characterisation.[G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].

Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.

Maximum Risk Characterization Ratio for Air Emissions RCRair	2,8E-02
Maximum Risk Characterization Ratio for Wastewater Emissions RCRwater	3,6E-01

EXPOSURE SCENARIO 4 of 6

Worker in Industrial Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE

Title	**Distribution of substance**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC15	Use as laboratory reagent
Environmental Release Category (ERC)	
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article).
ERC5	Use at industrial site leading to inclusion into/onto article.
ERC6A	Use of intermediate.
ERC6B	Use of reactive processing aid at industrial site (no inclusion into or onto article).
ERC6C	Use of monomer in polymerization processes at industrial site (inclusion or not into/onto article).
ERC6D	Use of reactive process regulators in polymerization processes at industrial site (inclusion or not into/onto article).
ERC7	Use of functional fluid at industrial site.
Specific Environmental Release Category (SpERC)	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, and associated laboratory activities. Excludes emissions during transport.
Assessment Method	See Section 3.

SECTION 2: OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES

Section 2.1: Control of worker exposure

Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
	Assumes use at not more than 20°C above ambient temperature, unless stated differently [G15].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize 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 [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Process sampling [CS2] + Outdoor [OC9].	Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out operation for more than 15 minutes [OC26]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk product storage [CS85].	Store substance within a closed system [E84]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure [E12]. Wear suitable gloves tested to EN374 [PPE15].

Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Product sampling [CS137].	Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out operation for more than 15 minutes [OC26]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Marine vessel/barge (un)loading [CS510].	Clear transfer lines prior to de-coupling [E39]. Transfer via enclosed lines [E52]. Avoid carrying out operation for more than 4 hours [OC28]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Road tanker/Railcar loading [CS511].	Ensure material transfers are under containment or extract ventilation [E66]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Section 2.2: Control of environmental exposure	
Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	3,7E+05
Fraction of Regional tonnage used locally	2,0E-03
Annual site tonnage (tonnes/year)	7,4E+02
Maximum daily site tonnage (kg/day)	3,7E+04
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10

Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM):	1,00E-04
Release fraction to wastewater from process (initial release prior to RMM):	1,00E-07
Release fraction to soil from process (initial release prior to RMM):	0,00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j].	
No wastewater treatment required [TCR6].	
Treat air emission to provide the required removal efficiency of (%):	9,0E +01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	0,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥0,0
Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
[STP1]. Not applicable as there is no release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	92,2
Assumed domestic sewage treatment plant flow (m3/d):	2,00E+03
Maximum allowable site tonnage (MSafe) (kg/d):	1,2E + 05

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 [ETW3].

Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].

Available hazard data do not support the need for a DNEL to be established for other health effects [G36].

Risk Management Measures are based on qualitative risk characterisation.[G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].

Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.

Maximum Risk Characterization Ratio for Air Emissions RCRair	3,1E-01
Maximum Risk Characterization Ratio for Wastewater Emissions RCRwater	2,7E-03

EXPOSURE SCENARIO 5 of 6

Worker in Industrial Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE

Title	**Use as a fuel**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC16	Use of fuels
Environmental Release Category (ERC)	
ERC7	Use of functional fluid at industrial site
Specific Environmental Release Category (SpERC)	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes 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 form of product	Liquid, vapour pressure < 0.5 kPa at STP [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
	Assumes use at not more than 20°C above ambient temperature, unless stated differently [G15].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	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 [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
General exposures (closed systems) [CS15] + Product sampling [CS137].	Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Avoid carrying out operation for more than 1 hour [OC27]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk product storage [CS85].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Store substance within a closed system [E84]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk closed unloading [CS502] + Outdoor [OC9].	Transfer via enclosed lines [E52]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Drum/batch transfers [CS8].	Ensure material transfers are under containment or extract ventilation [E66]. , or [G9]: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Avoid carrying out operation for more than 1 hour [OC27]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Operation of solids filtering equipment [CS117].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Avoid carrying out operation for more than 4 hours [OC28]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Use as a fuel [GEST12_I] + (closed systems) [CS107].	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Section 2.2: Control of environmental exposure	
Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	1,3E+05
Fraction of Regional tonnage used locally	1,0E+00
Annual site tonnage (tonnes/year)	1,3E+05
Maximum daily site tonnage (kg/day)	4,5E+05
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	

Release fraction to air from process (initial release prior to RMM):	5,0E- 03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E - 05
Release fraction to soil from process (initial release prior to RMM):	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b].	
If discharging to domestic sewage treatment plant, additional wastewater treatment required	
Treat air emission to provide the required removal efficiency of (%):	9,5E + 01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	97,3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥65,4
Organization measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
[STP1]. Not applicable as there is no release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	97,3
Assumed domestic sewage treatment plant flow (m3/d):	2,00E+03
Maximum allowable site tonnage (MSafe) (kg/d):	4,5E + 05

Conditions and measures related to external treatment of waste for disposal

Combustion emissions limited by required exhaust emission controls [ETW1].

Combustion emissions considered in regional exposure assessment [ETW2].

External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]

Conditions and measures related to external recovery of waste

This substance is consumed during use and no waste of the substance is generated [ERW3].

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].

Available hazard data do not support the need for a DNEL to be established for other health effects [G36].

Risk Management Measures are based on qualitative risk characterization.[G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].

Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.

Maximum Risk Characterisation Ratio for Air Emissions RCRair	5,7E-01
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	9,1E-01

EXPOSURE SCENARIO 6 of 6

Worker in Professional Settings

MAZOUT RMG 380 0.5%S

SECTION 1: EXPOSURE SCENARIO TITLE	
Title	**Use as a fuel**
Substance name	Residues (petroleum), topping plant, low-sulfur
CAS No.	68607-30-7
Use descriptors	
Process category (PROC)	
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC8A	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities.
PROC8B	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC16	Use of fuels
Environmental Release Category (ERC)	
ERC9A	Widespread use of functional fluid (indoor)
ERC9B	Widespread use of functional fluid (outdoor)
Specific Environmental Release Category (SpERC)	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
SECTION 2: OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1: Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	Liquid, vapour pressure <0.5 kPa at STP. [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
	Assumes use at not more than 20°C above ambient temperature, unless stated differently [G15].
Contributing Scenario	**Risk Management Measures**
General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimize 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 authorized persons; provide specific activity training to operators to minimize 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 [G20].
General exposures (closed systems) [CS15].	Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Avoid carrying out operation for more than 1 hour [OC27]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
General exposures (closed systems) [CS15] + Product sampling [CS137].	Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Avoid carrying out operation for more than 1 hour [OC27]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Refueling [CS507].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 1 hour [OC27]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk closed unloading [CS502].	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

	Avoid carrying out operation for more than 1 hour [OC27]. , or [G9]: Ensure material transfers are under containment or extract ventilation [E66].
Equipment cleaning and maintenance[CS39].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Drain down system prior to equipment break-in or maintenance [E65]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Clear spills immediately [C&H13]. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].
Drum/batch transfers [CS8].	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Avoid carrying out operation for more than 1 hour [OC27]. , or [G9]: Ensure material transfers are under containment or extract ventilation [E66].
Use as a fuel [GEST12_I] + (closed systems) [CS107].	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].

Section 2.2: Control of environmental exposure

Product characteristics	
Physical form of product	Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].
Amounts used	
Fraction of EU tonnage used in region	0,1
Regional use tonnage (tonnes/year)	7,5E+04
Fraction of Regional tonnage used locally	5,0E-04
Annual site tonnage (tonnes/year)	3,7E+01
Maximum daily site tonnage (kg/day)	1,0E+02
Frequency and duration of use	
Continuous release [FD2].	
Emission Days	365
Environmental factors not influenced by risk management	

Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from wide dispersive use (regional use only):	1,0E-04
Release fraction to wastewater from wide dispersive use:	1,0E-05
Release fraction to soil from wide dispersive use (regional use only):	0,00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j].	
No wastewater treatment required [TCR6].	
Treat air emission to provide the required removal efficiency of (%):	*Not applicable.*
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%):	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%):	≥0,0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2].	
Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
[STP1]. Not applicable as there is no release to wastewater.	

Estimated substance removal from wastewater via domestic sewage treatment (%):	92,2
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%):	92,2
Assumed domestic sewage treatment plant flow (m3/d):	2,0E+03
Maximum allowable site tonnage (MSafe) (kg/d):	3,3E + 02

Conditions and measures related to external treatment of waste for disposal

Combustion emissions limited by required exhaust emission controls [ETW1].

Combustion emissions considered in regional exposure assessment [ETW2].

External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3].

Conditions and measures related to external recovery of waste

This substance is consumed during use and no waste of the substance is generated [ERW3].

SECTION 3: EXPOSURE ESTIMATION

3.1. Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated [G21].

3.2. Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

SECTION 4: GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

4.1 Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [G22].

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].

Available hazard data do not enable the derivation of a DNEL for carcinogenic effects [G33].

Available hazard data do not support the need for a DNEL to be established for other health effects [G36].

Risk Management Measures are based on qualitative risk characterization.[G37].

4.2 Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].

Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. [DSU3]	
Further details on scaling and control technologies are provided in CEFIC - SpERC factsheet.	
Maximum Risk Characterization Ratio for Air Emissions RCRair	3,1E-01
Maximum Risk Characterization Ratio for Wastewater Emissions RCRwater	9,9E-04