

Date of issue: 30/11/2010

Version: 4

Date of revision: 20/10/2016

Reason for revision: changes at §1.1 (Name of the substance, Index number)

1 Identification of the substance or mixture and of the company

1.1 Identification of the product

Name of the substance: FUEL OIL
Synonyms: Fuel oil, residues
CAS number: 68476-33-5
CE number: 270-675-6
Index number: 649-024-00-9
Registration number: 01-2119474894-22-0041
Chemical formula: **The substance is a UVCB complex**, therefore it is not possible to give a molecular formula.
Molecular Weight: **The substance is a UVCB complex**, therefore it is not possible to give a molecular weight.

1.2 Identified relevant use of the substance or mixture and use not recommended

COMMON USES: Fuel for heating and other industrial uses

USES IDENTIFIED IN THE CHEMICAL SAFETY REPORT: General list of applications:

- *Industrial use: Production of the substance, use as an intermediate, distribution of the substance, formulation and (re)packaging of the substances and mixtures, use in coverings, use as fuel*
- *Professional use: Use as fuel, use in coverings, road and building applications*

Consult section 16 for a complete list of uses for which an ES exposure scenario is provided annexed to this sheet.

USES NOT RECOMMENDED: the relevant uses are listed above. Other uses are not recommended unless an evaluation has been carried out, before the beginning of the aforementioned use, which demonstrates that this use will be controlled. The single registrars are responsible for any additional evaluation.

1.3 Identification of the supplier of the safety data sheet:

IPLOM S.p.A.
via C. Navone, n. 3/b
16012 BUSALLA (GE) - Italy

Competent person responsible for the safety sheet (reg EC 1907/2006): dott.ssa Repetto Chiara E –mail: laboratorio@iplom.com

Urgent call telephone number: 010 9623-1 (with dial-through function)

1.4 Emergency telephone number:

Az. Osp. Univ. Foggia	Foggia	0881-732326
CAV Policlinico "Umberto I"	Roma	06-4450618
CAV Policlinico "A. Gemelli"	Roma	06-3054343
Az. Osp. "Careggi" U.O. Tossicologia Medica	Firenze	055-7947819
CAV Centro Nazionale di Informazione Tossicologica	Pavia	0382-24444
Osp. Niguarda Ca' Granda	Milano	02-66101029
Osp. Riuniti di Bergamo	Bergamo	800883300

2 Hazard Identification

Physical-chemical hazard: no hazard according to the classification criteria as shown in Annex I part 2 of the 1272/2008 Regulation, and in Annex VI of the 67/548/EEC Directive modified by the 2006/121/EC Directive.

Health hazards: the substance has harmful effects by inhalation, and in case of prolonged exposure by inhalation, it can cause serious damage to health. It may cause dryness and cracking of the skin in case of repeated exposure. It may cause neoplastic effects. It is suspected to harm the unborn child.

Environmental danger: The substance has highly toxic effects for aquatic organisms with long term effects for the aquatic environment.

2.1 Classification of the substance or mixture

EC 1272/2008 (CLP) Regulation Classification

Acute Tox. 4: H332

Carc. 1B H350

Repr. 2 H361d

STOT RE 2 H373

Aquatic Chronic 1 H410

The list of R and H phrases is shown in section 16

Directive 67/548/EEC Classification

Xn; R20- 48/21

Carc. Cat. 2; R45

Repr. Cat. 3.; R63

R66;

N; R50-53.

2.2 Label elements



Warning: **HAZARD**

Danger indications:

H332: Harmful if inhaled

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to organs through prolonged and repeated exposure.

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

EU H066 Repeated exposure may cause skin dryness and cracking

Precautionary statements:

Prevention

- P201: Obtain special instructions before use
P260: Do not breathe mist/vapours/spray
P273: Avoid release to the environment
P281: Use personal protective equipment as required

Reaction

P301+310: IF SWALLOWED: Immediately call a POISON CENTRE or a doctor/physician

Disposal

P501: Dispose of the product/container in compliance with Leg. Decree 152/06 and subsequent amendments and additions.

Further information: Note H

2.3 Other dangers

There is danger of thermal burns in case of direct contact with the skin or with the eyes, due to the fact that the product is usually kept or handled at high temperature.

A potential risk is the development of hydrogen sulphide (toxic gas) when the product is kept or moved at high temperatures. **When present, hydrogen sulphide may accumulate in the tanks or in confined areas, creating danger for the operators who have to enter them. In this case over-exposure may cause irritation of the respiratory tract, dizziness, nausea, loss of consciousness and death.**

Any substance, in case of accidents with piping under pressure and similar situations, may be accidentally injected in the subcutaneous tissue, even without any apparent external lesions. In this case, it is necessary to take the injured person to a hospital for the necessary treatment.

The product does not satisfy the PBT or VPvB criteria shown in annex XIII of the REACH.

3 Composition / information about the ingredients

3.1 Substances

The substance is a UVCB complex, CAS 68476-33-5 EINECS 270-675-6; Liquid product deriving from various refinery streams, usually residues. The composition is complex and it varies with the source of the raw materials. 100% in weight

This type of product contains sulphur compounds which, in particular circumstances, may release small quantities of hydrogen sulphide. (also see section 2).

3.2 Mixtures

n.a.

4 First aid measures

4.1 Description of first aid measures

Skin contact

Remove footwear and contaminated clothing and dispose of them safely (811). Wash the part in question with soap and water (849). Never use petrol, kerosene or other solvents to clean the contaminated skin (786). In case of irritation, blurry vision or persistent swelling, see a specialist doctor (721).

For minor thermal burns, cool the injured part (705).

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SAFETY SCHEDULE – FUEL OIL

conforms to EC Regulation n° 1907/2006 and subsequent amendments and additions

	<p>Keep the burnt part under cold water for at least 5 minutes, or until the pain disappears (709). Avoid general hypothermia (659). Do not put ice on the burn (684). DO NOT try to remove the parts of clothing attached to the burnt skin but cut around them (677).</p> <p>During the use of high pressure equipment, the product could be injected (850). In case of lesions due to high pressure, consult a doctor immediately (718). Do not wait for symptoms to appear (686).</p>
Contact with eyes	<p>Remove contact lenses, if worn, if the situation allows you to do so easily (808). Delicately rinse with water for a few minutes(814). Continue to rinse (670). Consult a doctor immediately in case of irritation, blurry vision or persistent swelling which develops and persists (817).</p> <p>If the hot product touches the eyes, rinse the damaged part with water in order to dissipate the heat (739). Consult a doctor immediately for an evaluation of the conditions and the necessary treatment for the injured person (733).</p>
Inhalation	<p>In case of difficulty breathing, take the injured person outdoors and keep them in a comfortable position for breathing (715).</p> <p>If the victim has lost consciousness (716) and is not breathing (790), make sure there are no obstructions in the respiratory tract and allow specialised staff to perform artificial respiration (694). If necessary, apply an external cardiac massage and consult a doctor (723).</p> <p>If the injured person is breathing (660), keep them in the lateral safety position (724). Administer oxygen if necessary (649).</p> <p>In case of suspected inhalation of H₂S (hydrogen sulphide) (729), rescuers must wear adequate respiratory equipment, safety belts and ropes and apply the correct first aid procedures (811). Immediately transfer the injured person to a hospital (822). Immediately start artificial respiration if breathing has stopped (731). Administer oxygen if necessary. (651)</p>
Ingestion/Aspiration	<p>Do not administer anything by mouth to an unconscious person (679). In case of spontaneous vomiting, keep the head lowered in order to avoid risking aspiration of the vomit into the lungs.</p>

4.2 Main symptoms and effects both acute and delayed

It may cause irritation of the skin (825), and slight irritation of the eyes (826). The inhalation of oil smokes and mists produced at high temperature may cause irritation of the respiratory tract (760). Contact with the hot product may cause serious thermal burns (666). Ingestion: few or no symptoms are expected (700). Possibly, nausea and diarrhea can occur (711).

4.3 Indication of the possible necessity to consult a doctor immediately and of special treatments.

Consult a doctor immediately in case irritation, swelling or redness develops and persists (817). Consult a doctor in all cases of serious burns (818).

5 Fire-fighting measures

5.1 Fire-fighting means

Small dimension fires: soil or sand (872), carbon dioxide (852), foam (859), dry chemical powder (856).

Large dimension fires: foam (859), water mist (887). Note: the use of water fog streams (water mist) is reserved to the adequately trained staff. Other inert gases (allowed by the regulation) (870).

Fire fighting means which are NOT adequate: Do not use water jets directly on the burning product (855), it may cause splashes and spread the fire (881). Avoid simultaneous use of foam and water on the same surface because water destroys foam (873).

5.2 Special dangers deriving from the substance or mixture

Incomplete combustion may generate a complex mixture of airborne solid and liquid particles and gases, including carbon monoxide (867), H₂S, SO_x (sulphur oxide) or sulphuric acid (861) and unidentified organic and inorganic compounds (886).

5.3 Recommendations for those responsible for fire fighting

In case of fire either in small or in poorly ventilated spaces, wear a complete fireproof protection suit and autonomous breathing gear with a complete positive pressure mask (864).

6 Measures in case of accidental release

6.1 Personal precautions, protection devices and procedures in case of emergency

If the safety conditions allow action, stop or contain the leak at the source (1006). Avoid direct contact with the released material (903). Remain up-wind (1003). In case of larger scale leak, warn the residents of the down-wind areas (956). Send staff away from the leak area, if not involved. Call the emergency teams (968). Except for cases of small scale leaks (925). The possibility of intervention must always be evaluated and approved, if possible, by qualified and competent staff in charge of managing emergencies (1007). Eliminate all sources of ignition if the safety conditions allow such action (for example: electricity, sparks, fires and flames) (920). In these cases, when the presence of a dangerous quantity of H₂S in the released product is suspected or has been established, supplementary or special actions may be indicated, such as the limiting access, use of special personal protective equipment, use of special procedures and training staff (963). When requested, inform the authorities of the event, in compliance with the applicable legislation (949).

Small scale leaks (995): the traditional antistatic work clothing is usually appropriate (983).

Large scale leaks: total protection clothing resistant to chemical agents and made of antistatic material (973). When necessary, heat resistant and heat-insulated (941). Work gloves that provide adequate resistance to chemical agents, particularly to aromatic hydrocarbons (1021). Gloves made of PVA (polyvinyl alcohol) are not water resistant and are not to be used in case of emergency (933). If contact with the hot product is possible or anticipated, gloves must be heat resistant and heat-insulated (936). Protective helmet (1030). Anti-static and anti-skid safety shoes or boots (899). Protective glasses or face protection devices in case splashes or contact with eyes is possible or anticipated (934). A semi-mask or full mask fitted with a filter(s) for organic vapours (and H₂S, when applicable) (892). Autonomous breathing gear may be used according to the scale of the leak and the anticipated level of exposure (895). In case the situation cannot be completely evaluated or if there is a risk of oxygen deficiency, only use autonomous breathing gear (951).

6.2 Environmental precautions

Do not allow the product to be discarded into the sewers, in rivers or in any other bodies of water (895).

6.3 Methods and materials for containing and cleaning up

Spills on the ground: If necessary, surround the product with dry soil, sand or any other non-inflammable material (940). Let the hot product cool down naturally (976). Large scale leaks can carefully be covered with foam, if available, in order to prevent the risk of fires (970). Do not use direct jets (918). Ensure appropriate ventilation inside buildings or in confined areas (1022). Absorb the spilt product with non-inflammable materials (896). If necessary, keep the contaminated material for subsequent safe disposal, exclusively using adequate containers (watertight, sealed, waterproof and connected to the ground) (939). In case of contamination of the ground, remove the contaminated earth and treat it in compliance with the local legislation (959).

Spills in water: Product less dense than water (987). In case of small leaks in closed waters (e.g.: in harbours) (957), contain the product using floating barriers or other devices (958). Collect the spilt product with specific floating absorbent materials (910). If possible, contain larger leaks in water using floating barriers or mechanical equipment (948). If it is not possible, control the level of dispersal of the spilt product and collect the material using a skimmer or another mechanical device (952). The use of dispersion agents must be suggested by an expert and, when requested, it must be authorized by the competent local authorities (1012). If the product is denser than water it will sink and settle on the underwater surface, generally making any type of intervention impossible (988). If possible, gather the product and the contaminated material with mechanical equipment and move on to stockpiling/disposal in compliance with the applicable legislations (945). In special situations (to be evaluated based on the opinion of an expert and on the local conditions), the creation of trenches for the collection of the product or of its burial in the sand can be a viable option (962).

The recommended measures are based on the most probable scenarios of spillage of the product. Local conditions (wind, air temperature, direction and speed of waves and currents), however, can significantly effect the decision regarding the action to be taken (990).

6.4 Reference to the sections

For further information regarding personal protective equipment, see the “Exposure control and individual protection” section (1086).

6.5 Further information:

The concentration of H₂S in the upper part of the tank may reach dangerous values, particularly in case of prolonged storage (912). This situation is particularly relevant for operations which entail direct exposure to the vapours in the tank (1014).

The dispersion of a limited quantity of product, particularly in the open air where vapours spread quicker, creates a dynamic situation which is presumably able to limit the exposure to dangerous concentrations (999). (999). Due to the fact that H₂S has a greater density compared to that of air, a possible exception may regard the accumulation of dangerous concentrations in specific places such as ditches, depressions or closed spaces (902). However in all these circumstances, the evaluation of the correct intervention to be used must be done case by case (954).

7 Handling and storage

7.1 Precaution for safe handling

7.1.1 Protection measures

Obtain special instructions before use (1105).

Make sure that all provisions regarding structures designed for the management and stockpiling of inflammable products are being correctly respected (1080). Take precautionary measures against static electricity (1134). Make sure that the container, the tanks and the equipment for reception and transfer are earthed (1087). Vapour is heavier than air (1137). Pay particular attention to accumulation in pits and in confined spaces (1051). Apply the provisions regarding explosive atmospheres and fire prevention, when applicable.

Keep away from heat sources/sparks/open flames/hot surfaces (1097). Do not smoke.

The product may release H₂S (hydrogen sulphide): carry out a specific assessment of the risk of inhalation deriving from the presence of hydrogen sulphide in the empty spaces of the tanks, confined areas, residues and product overflows, sediment and reflux water in the tanks, and in all situations of non-intentional release, in order to determine what the best control equipment is in relation to the local conditions (E500).

Exclusively use outdoors or in a well ventilated space.

Use the appropriate personal protective equipment if necessary (1146). Do not use compressed air during the operations of filling, discharging or handling (1073). Prevent the risk of slipping (1111). For further information regarding personal protective equipment and operative conditions, see the "Exposure scenarios" section (1085).

Do not release into the environment (1046).

7.1.2 Indications regarding hygiene at work

Do not breathe mist/vapours/spray (P260). Avoid contact with skin (1042). Keep away from food and drinks (1096). Do not eat, drink or smoke while handling the product (1041). Wash hands carefully after handling the product (1156). Do not use contaminated clothing again. Contaminated material must not accumulate in work spaces and it must never be stored in a pocket (1061). Make sure that adequate cleaning measures are being taken (housekeeping). (1081)

7.2 Conditions for safe storage, including possible incompatibility

The structure of the storage area, the characteristics of the tanks, the equipment and the operative procedures must comply with the relative legislation on a European, national and local scale (1127). The stockpiling plants must have adequate systems to prevent contamination of the ground and of waters in case of leaks or spillage (1129). The cleaning, inspection and maintenance activities of the internal structure of the stockpiling tanks must be done by a qualified and correctly equipped staff, as established by the national and local legislation or by company regulations (1054). Before entering the stockpiling tanks and starting any type of intervention in a confined space, check the atmosphere and establish the oxygen content, the presence of hydrogen sulphide (H₂S) and the degree of flammability (1150).

Keep separate from the oxidizing agents (1133).

Use mild steel or stainless steel for the containers and coverings (1116). Use approved material which is adequate for the use of the product for making the containers and coverings (1083). Some synthetic materials can be inadequate for containers and coverings based on the characteristics of the material and its intended use (1125). Verify compatibility of materials with the producer in relation to the conditions of use (1055).

If the product is supplied in containers (1094), keep it exclusively in the original containers or in a container which is adequate for the type of product (1099). Store in a well ventilated space (1131).

Carefully keep the containers closed and correctly labelled (1098).

Empty containers may contain combustible product residues. (1077). Do not weld, braze, drill, cut or burn empty containers unless they have been adequately cleaned out (1075).

7.3 Specific final uses

See the exposure scenarios annex

8 Exposure control and personal protection

8.1 Control parameters

Limit values of exposure (substance):

Mineral oil:

ACGIH 2010:-{ }-

TLV®-TWA: Exposure must be maintained as low as possible (scarcely and averagely refined mineral oil):

5 mg/m³ (pure highly or differently refined mineral oil)

Limit values of exposure (airborne contaminants):

Hydrogen sulphide:

Directive 2009/161/EU:

- Limit values (8 hours): 5 ppm; 7 mg/m³
- Limit values (short term): 10 ppm; 14 mg/m³

ACGIH 2010:

- TLV®-TWA: 1 ppm

- TLV®-STEL: 5 ppm

Monitoring procedures: see Leg. Decree 81/2008 and subsequent amendments and additions or the good industrial hygiene procedures.

DNEL (Derived No Effect Level)

Route of exposure	DNEL Workers				DNEL general population			
	Chronic, local effects	Chronic, systemic effects	Acute, local effects	Acute, systemic effects	Chronic, local effects	Chronic, systemic effects	Acute, local effects	Acute, systemic effects
oral	n.a.	n.a.	n.a.	n.a.	n.a.	0.015 mg/kg/24h	n.a.	n.a.
dermal	n.d.	0.065 mg/kg/8h	Note a	Note a	Note a	Note a	Note a	Note a
respiratory	Note a	0.12 mg/m ³ /8h (aerosol)	Note a	4,700 mg/m ³ /15 min (aerosol)	Note a	Note a	Note a	Note a

Note a: no danger was identified for this route of exposure

DMEL (Derived Minimal Effect Level)

Not identified because not sufficient doses-descriptors were available.

PNEC(S) (Predicted No Effect Concentration)

See the exposure scenarios annex

8.2 Exposure control

8.2.1 Suitable technical control

Minimize exposure to mists/vapours/aerosols. During handling of the hot product in confined spaces, ensure efficient ventilation (1217). Before entering the stockpiling tanks and starting any type of intervention in a confined space, check the atmosphere and establish the oxygen content, the presence of hydrogen sulphide (H₂S) and the degree of flammability (1050).

8.2.2 Individual protection measures

(a) Eyes/face protection:

In case of risk of contact with eyes/face, wear a complete protection for the head and face (visor and/or protection glasses (EN 166)) (1185).

(b) Skin protection:

i) Hand protection:

In case of possible contact with the skin, use gloves with high cuffs that are hydrocarbon resistant, felt-lined internally and, if necessary, heat-insulated. Presumably adequate materials: nitril, PVC or PVA (polyvinyl alcohol) with a protection index of at least 5 (permeation time > 240 minutes). Use gloves in compliance with the conditions and limits of use established by the producer. In case of need, refer to the UNI EN 374 regulation. Gloves must undergo periodical inspection and must be replaced in case of wear, perforation or contamination (1174).

ii) Further information

Wear protection clothing during operations which involve hot material, heat resistant clothing (with trousers over boots and sleeves over the gloves' cuffs), heavy heat-proof and anti-skid boots (e.g.: leather) (EN 943-13034-14605) (1216). Resistant to chemical agents.

In case of contamination of clothing, replace them and immediately clean them.

(c) Respiratory protection:

In places in which hydrogen sulphide can accumulate use approved respiratory tract protection devices: full masks with a type B filter cartridge (grey for organic vapours, including H₂S), or autonomous breathing equipment (EN 529) (1163). If it is not possible to determine or estimate the levels of exposure with certainty or if an oxygen deficiency is possible, exclusively use autonomous breathing equipment (1183).

(d) Thermal danger: see previous letter (b)



8.2.3 Environmental exposure control

Do not release into the environment (1046). The stockpiling plants must have adequate systems to prevent contamination of the ground and of waters in case of leaks or spillage (1129).

Treatment of drainage water on site is required.

Prevent the release of non-dissolved substances or recuperate them from reflux water.

Do not distribute the mud created by the treatment of industrial water on natural land.

The mud created by the treatment of industrial water must be incinerated, kept contained or treated. For further details see the exposure scenarios annex.

8.3 Further information

For further information regarding personal protective equipment and operative conditions, see the "Exposure scenarios" section (1087).

9 Physical and chemical properties

a) Appearance:	viscous black liquid
b) Odour:	like petrol
c) Olfactory threshold:	n.d.
d) pH:	n.a.
e) Melting point/Freezing point:	< 30° C (EN 3060, ASTM D97)
f) Initial boiling point and boiling interval:	150°-750°C
g) Flash point:	> 75°C
h) Evaporation rate:	n.a.
i) Flammability (solid, gas):	n.a.
j) Higher/lower limits of flammability or explosion:	n.a.
k) Vapour pressure:	0.02-0.79kPa at 120°C Mw 330-500 ASTM D 2878
l) Vapour density:	n.a.
m) Relative density:	840-1100 kg/m ³ (absolute density for UVBC-EN ISO 12185, ASTM, D 4052 and/or EN ISO 3675, ASTM 1298)
n) Solubility/solubilities:	Solubility in water non applicable because

<p>o) <i>N</i>-octano/water partition coefficient:</p> <p>p) Auto ignition temperature:</p> <p>q) Decomposition temperature:</p> <p>r) Viscosity:</p> <p>s) Explosive properties:</p> <p>t) Oxidising properties:</p>	<p><i>classified as a UVCB substance non applicable because classified as a UVCB substance</i></p> <p>>220°C ASTM 659</p> <p>n.a.</p> <p>>20.5 mm²/s at 40°C</p> <p>no chemical group can be associated to the molecule with explosive properties</p> <p><i>the substance does not react exothermically with inflammable materials</i></p>
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9.2 Further information:

Not available

10 Stability and reactivity

10.1 Reactivity

The substance does not present further dangers relating to reactivity other than those shown in the following paragraphs.

10.2 Chemical stability

This substance is stable in all ordinary circumstances and in normal conditions of use.

10.3 Possibility of dangerous reactions

Contact with strong oxidants (such as peroxides and chromates) may cause risk of fire. (612) A mixture with nitrates or other strong oxidants (such as chlorates, perchlorates and liquid oxygen) may create an explosive mixture. (609). Sensitivity to heat, friction and shock cannot be evaluated in advance (616).

10.4 Conditions to be avoided

Keep separate from the oxidizing agents (1133).

Keep away from heat sources/sparks/open flames/hot surfaces (1097). Do not smoke.
Avoid the formation of electrostatic charges.

10.5 Incompatible materials

Strong oxidants

10.6 Hazardous decomposition products

This substance does not decompose when used for its purpose.

11 Toxicological information

11.1 Toxicokinetics, metabolism and distribution

There is no experimental data available about absorption, distribution, metabolism and elimination of the substances that are part of the fuel oil category.

Absorption through skin is possible, however it is presumed to be relatively low, because only about 2% of hydrocarbons have a log Pow <5. This is also supported by the results of tests run on animals to evaluate

acute skin toxicity: no death and only limited systemic changes. This indicates that absorption through skin is limited and that the hydrocarbon components that are absorbed have low intrinsic toxicity. We can presume that absorption through lungs is low both because acute inhalatory toxicity on rats did not show any macroscopic variation at the autopsy, and because of low solubility of fuel oil in water. As far as absorption after ingestion is concerned, we presume that there is absorption in micellar form because most of the fuel oil's components have a Log Pow >5.

11.2 Toxicological information

a) Acute toxicity:

Oral

Acute oral toxicity of samples belonging to the fuel Oil category was evaluated in a series of studies. All studies reported signs of reversible intoxication and lethargy immediately after the administration, intestinal irritation and/or altered intestinal function (reduced faeces production, etc.) with occasional modifications to the macroscopic appearance of the liver, kidneys, lungs etc. at the autopsy. These results do not guide us to any classification in compliance with the regulations regarding dangerous substances.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RAT 4320 (females) 5270 (males) ORAL (gavage) OECD Guideline 401(Acute Oral Toxicity)	LD50: 5270 (males) LD50: 4320 mg/kg/ (females)	Key study (most pertinent study) CAS 64741-62-4	American Petroleum Institute Study(API) 1982

Inhalation

In order to evaluate acute inhalation toxicity of the products belonging to the fuel oil category, some studies on rats are available (limit studies or multi group LD50). The methods followed are EPA OTS 798.1150.

These results allow us to classify the substance Xn R20 (Harmful by inhalation) and H332. (Harmful if inhaled).

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RAT EPA OTS 798.1150 (Acute Inhalation Toxicity)	LC50 mg/l/4 hours: 4.5 (females) LC50 mg/l/4 hours: 4.1 (males)	Key study (most pertinent study) CAS 64741-62-4	ARCO 1987 (Atlantic Richfield Company)

Dermal contact

Acute dermal toxicity of samples belonging to the fuel Oil category was evaluated in a series of studies carried out mainly on rabbits. From these studies, an acute dermal LD50 resulted over 2g/kg which does not imply any classification in compliance with the regulations regarding dangerous substances.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RABBIT	LD50 >2000 mg/kg	Key study (most	ARCO 1987

EU Method B.3 (Acute Dermal Toxicity)	(males/females)	pertinent study) CAS 68476-33-5	(Atlantic Richfield Company)
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b) Skin corrosion/irritation

The potential of acute skin toxicity of samples belonging to the fuel oil category was evaluated in a great number of studies carried out generally on rabbits. The conclusions of these studies indicate a potential moderate skin irritation, with no evidence of deep lesions (corrosion).

These results do not guide us to any classification in compliance with the regulations regarding dangerous substances.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RABBIT EU Method B.4 (Acute Toxicity: Dermal Irritation/Corrosion)	Index of primary irritation: 2,6 slight and well defined erythema and variable oedema	“Weight of evidence” Study CAS 68476-33-5	ARCO 1986 (Atlantic Richfield Company)

c) Serious eye lesions/serious eye irritation

The potential of eye irritation of samples belonging to the fuel oil category was evaluated in a great number of studies carried out generally on rabbits.

All the studies only revealed a transient and reversible eye irritation, no classification of the substance is therefore necessary.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RABBIT EU Method B.5 (Acute Toxicity: Eye Irritation/Corrosion)	Not irritating	“Weight of evidence” Study CAS 68476-33-5	ARCO 1986 (Atlantic Richfield Company)

d) Respiratory or skin sensitization

Respiratory sensitization:

This endpoint is not a REACH requirement and there is no available data for this endpoint. The products belonging to the fuel oil category do not create sensitization of the respiratory tract, no classification of the substance is therefore necessary.

Skin sensitization:

There are various studies available that were carried out in order to test the sensitizing potential of the products belonging to the fuel oil category (annex V method B.6 (skin sensitization); Buehler method).

The results obtained by these studies indicate the absence of potential skin sensitization, no classification of the substance is therefore necessary.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
GUINEA PIG EU Method B.6 (Skin Sensitization)	Not sensitizing	“Weight of evidence” Study CAS 68476-33-5	ARCO 1986 Study (Atlantic Richfield Company)
GUINEA PIG	Not sensitizing	“Weight of evidence” Study	ARCO 1988 Study

EU Method B.6 (Skin Sensitization)		CAS 68476-33-5	(Atlantic Richfield Company)
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e) Germ cell mutagenicity

The muta-genicity potential of fuel oil has been widely studied in a series of live and vitro tests. Most of the studies did not show coherent proof of mutagenicity. No classification is required in compliance with the regulations regarding dangerous substances.

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
In vitro Ames test S. typhimurium TA98	Positive (with and without activation)>10000 ug/plate	Key study CAS 64741-62-4 Reliable with restrictions	American Petroleum Institute Study 1986
Method	Result	Comments	Source
Micronucleus assay (chromosome aberration) Mouse (CD-1)Male/female Oral: garage 0, 188, 375, 750 or 1500 mg/kg/bw/d(nominal concentration) Equivalent or similar to EU B.12	Negative Tests results: Genotoxicity: Negative(male/female);Toxicity: No effect	Key study CAS 64741-62-4 Reliable without restrictions	Przygoda, R.T.,McKee,R.H., Amoroso, M.A.And Freeman JJ (1999)
Method	Result	Comments	Source
Micronucleus assay (chromosome aberration) Mouse (CD-1)Male/female intraperitoneal 0, 188, 375, 750 or 1500 mg/kg/bw/d(nominal concentration) 0,750, 1500 or 3000 mg/kg/bw/d (nominal concentration) Equivalent or similar to EU B.12	Negative Tests results: Genotoxicity: Negative in both studies(male/female);Toxicity: No effect	Key study CAS 64741-62-4 Reliable without restrictions	Przygoda, R.T.,McKee,R.H., Amoroso, M.A.And Freeman JJ (1999)

f) Carcinogenicity

Most of the studies carried out demonstrate that fuel oils from straight-run and from cracked are carcinogenic. These results allow us to classify the substance as Carc. Cat. 2; R45 or Carc. 1B H350

The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
MOUSE 50 ul/on skin, twice a week during its life No guideline available.	Strongly carcinogenic for skin (LOAEC 1% increase of malignant tumours for the skin NOAEL 0.1%: Modest increase in the incidence of benign cutaneous tumours)	Key study CAS 64741-62-4	American Petroleum Institute Study 1989

g) Reproductive toxicity

Reproductive toxicity:

The table below contains a summary of the most indicative studies of the registration Dossier. Most of the studies did not show coherent proof of toxicity for fertility. No classification is required in compliance with the regulations regarding dangerous substances.

Method	Result	Comments	Source
RAT 0.1, 1, 10, 50, 250mg/kg/body weight/day Dermal administration 6 h/day EPA OTS 798.4700 (Reproduction and fertility effects study)	NOAEL 50 mg/kg systemic effects: decrease in body weight (male) NOAEL 250 mg/kg Toxicity for reproduction (male): No adverse effect of the weight of the reproductive organs, spermatic parameters and functional fertility	Support study CAS 64741-62-4 Reliable without restrictions	ARCO (1992 af)

Toxicity on development/teratogenesis:

The table below contains a summary of the most indicative studies of the registration Dossier.

The results of the tests on development indicate alterations in the foetus and in the development of newborns. These results allow us to classify the substance as Repr. Cat. 3.; R63 and Repr. 2 H361d (suspected of damaging the unborn child)

Method	Result	Comments	Source
RAT 0.5, 1, 10, 50, 2550 mg/kg mg/kg/body weight/day Dermal administration 6 h/day	NOAEL 0.05 mg/kg Maternal toxicity, effects: decrease in weight, effects on the consumption of food, vaginal fluxes NOAEL 0.05 mg/kg Toxicity on development, effects: Decrease in weight of the pregnant	Key study CAS 64741-62-4	Hoberman, AM, Christian, MS, Lovre, S, Roth, R and Koschier, F. 1995 EPA OTS 798.4900 (Prenatal Development Toxicity Study)

	uterus, re-absorptions, reduction of the foetus' weight.		
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RAT 0, 50, 333, 1000 mg/kg mg/kg/body weight/day Dermal administration 6 h/day	NOAEL 333 mg/kg Maternal toxicity, effects: Decrease of body weight, increase of pregnancy duration. NOAEL 333 mg/kg Toxicity on development, effects: Decrease in weight of the newborn	Key study CAS 64741-45-3	ARCO 1988 (Atlantic Richfield Company) 1994
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h) Specific toxicity for organ targets (STOT) – single exposure:

no information is available

i) Specific toxicity for organ targets (STOT) – repeated exposure:

Oral

In compliance with column 2 of REACH, annex VIII (8.6.1) and VIII (8.6.2), repeatedly dosed toxicity must be evaluated with the adequate procedure. This requirement is met by the tests available for repeated cutaneous doses, therefore it is not necessary to run repeated oral dose tests.

Dermal

The following effects were witnessed in relation to skin administration: variation of haematological and bio-chemical parameters and variation in weight of a few organs. At higher doses, alterations to the serous cholesterol also occurred. Fuel oil may cause systemic alterations following repeated dermal exposure, which allows us to classify the substance as Xn R48/21 and STOT RE 2 H373: May cause damage to organs through prolonged and repeated exposure. The table below contains a summary of the most indicative studies of the registration Dossier.

Method	Result	Comments	Source
RAT Pure product: 0, 1, 10, 50 mg/kg mg/kg/body weight/day Diluted in acetone: 0.01, 1, 10, 50 mg/kg mg/kg/body weight/day Occlusive medication 6h/day, 5 days a week for 4 weeks	NOAEL systemic toxicity (pure product) in males: 10 mg/kg/day effects: Decrease in weight, decrease of the haematological parameters, effects of bio-chemical parameters, variation in weight of a few organs; NOAEL: systemic toxicity (pure product) in females: 1 mg/kg/day; effects: Increase in weight of the liver, increase of the potassium levels in the serum; LOAEL: Local effects (pure product) in males and females: 1mg/kg/day effects: slight and sporadic erythema, dry skin. NOAEL: systemic toxicity (applied with acetone) in males: 1mg/kg/day effects: Decrease in haematological parameters, increase in weight of the	Key study CAS 64741-62-4	ARCO 1993 (Atlantic Richfield Company)

Method	Result	Comments	Source
	liver; NOAEL: systemic toxicity (applied with acetone) in females: 1mg/kg/day effects: increase in weight of the liver; LOAEL: local effects (applied with acetone) in males and females: 0.01mg/kg/day effects: slight and sporadic erythema, dry skin.		

Inhalation

In compliance with column 2 of REACH, annex VIII (8.6.1) and VIII (8.6.2), repeatedly dosed toxicity must be evaluated with the adequate procedure. This requirement is met by the tests available for repeated skin doses, and the low pressure of the vapour of the components of fuel oil makes the inhalation tests useless.

j) **Inhalation danger:**

Due to the fact that the substances of the fuel oil category have viscosity < 20.5 mm²/s at 40°C, **it is possible that the product may be inhaled by the lungs.**

Further information:

The substance has moderate capacity to cause photo-irritation.

12 Ecological information

In general:

Based on the ecological information shown below and based on the criteria indicated by the regulations regarding dangerous substances, fuel oil is classified as dangerous for the environment N; R50-53 or Aquatic Chronic 1 H410.

12.1 Toxicity

The table below contains a summary of the most indicative studies of the registration Dossier.

Endpoint	Result	Comments
Aquatic toxicity		
Invertebrates Daphnia magna Short term	EL50 48/hours: 2 mg/l	Key study
Invertebrates Daphnia magna Long term	NOAEL: 0.27 mg/l	Key study
Seaweed Selenastrum capricornutum Growth inhibition	ErL50 72/h 0.75 mg/l (); NOEL < 1 mg/l	Key study
Fish Short term Pimephales promelas	LL50 96h: 79 mg/l	Key study

Fish Long term	NOEL: 0.1 mg/l	Key study
Activated mud: (Breathing inhibition test)	LL50>1000 mg/l	Key study
Effects on terrestrial organisms		
Birds long term/oral/22 weeks Anas platyrhynchos	NOAEL: 20,000 mg/kg	Key study

12.2 Persistence and degradability

Abiotic degradability

Hydrolysis: Heavy fuel oils are hydrolysis resistant due to the lack of a functional group that is hydrolytically reactive. Therefore, this process will not contribute to a measurable loss of the substance due to degradation in the environment.

Photolysis in air: The standard tests for this endpoint are not applicable to UVCB substances.

Photolysis in water and earth: Due to the fact that only wavelengths below 290 nm can be absorbed by hydrocarbon molecules, and to the fact that these rays are screened by the ozone layer, this process will not contribute to a measurable loss in the environment due to degradation of the substance.

Biotic degradability:

Water/sediments/ground: The standard tests for this endpoint are not applicable to UVCB substances.

12.3 Bio-accumulation potential

The standard tests for this endpoint are not applicable to UVCB substances.

12.4 Mobility in the ground

Koc absorption: The standard tests for this endpoint are not applicable to UVCB substances.

12.5 Results of the PBT and vPvB evaluation

Comparison with the criteria of annex XIII of the REACH regulation

Persistency evaluation: A few of the hydrocarbon structures contained in this category have P (Persistent) or Vp (Very Persistent) characteristics.

Evaluation of bio-accumulation potential: The structure of most hydrocarbons contained in this category DO NOT have vB (Very Bioaccumulative) characteristics, however a few components have B (Bioaccumulative) characteristics.

Toxicity evaluation: for the structures that demonstrated having P and B characteristics, toxicity was evaluated but no relevant component satisfies the criteria of toxicity except for anthracene which has been confirmed to be a PBT. Due to the fact that anthracene is found in concentrations < 0.1%, the product is not PBT/vPvB.

12.6 Other adverse effects

Not available.

13 Comments on disposal

13.1 Refuse treatment methods

Do not dispose of the product on ground or in sewers, tunnels or streams.

For the disposal of refuse deriving from the product, including uncleaned empty containers, comply with Leg. Decree 152/06 and subsequent amendments and additions.

C.E.R. refuse code: 13 07 01 (Ref: 2001/118/EC and Min. Environment Directive 9/04/2002) this code is

only a general indication, based on the original composition of the product and its purpose. The possessor holds the responsibility of choosing the most adequate code based on the use of the product, possible alterations and contaminations.

Disposal of containers: Do not dispose of containers in the environment. Dispose of the product in accordance with the local regulations in force.

Do not drill, cut, sand, weld, braze, burn or incinerate empty containers or tanks that have not been cleaned out.

14 Transport Information

Road / railway transport (RID/ADR)

14.1 UNO number:

CASE A (oil sent at a higher temperature than that of the flashpoint): 3256

CASE B (oil sent at a temperature higher than 100°C): 3257

CASE C (oil sent at a lower temperature than those indicated above): 3082

14.2 UNO shipping name:

CASE A: HOT TRANSPORTED LIQUID, INFLAMMABLE, N.A.S. (Desulphurised heavy fuel oil)

CASE B: HOT TRANSPORTED LIQUID, N.A.S. (Desulphurised heavy fuel oil)

CASE C: DANGEROUS SUBSTANCE FROM AN ENVIRONMENTAL POINT OF VIEW, LIQUID, N.A.S. (Desulphurised heavy fuel oil)

14.3 Danger classes in relation to transport:

Road / railway transport (ADR/RID):

CASE A:

Class: 3

Classification code: F2

Danger labels: 3 + Environmental Danger Marking

Danger identification number: 30

CASE B:

Class 9

Classification code: M9

Danger labels: 9 + Environmental Danger Marking

Danger identification number: 99

CASE C:

Class 9

Classification code: M6

Danger labels: 9 + Environmental Danger Marking

Danger identification number: 90

Maritime transport (IMDG):

CASE A: Class 3

CASE B: Class 9

CASE C: Class 9

Air transport (ATA):

CASE A: Class 3 (transport is forbidden both on cargo and passenger flights)

CASE B: Class 9 (transport is forbidden both on cargo and passenger flights)

CASE C: Class 9

14.4 Packaging groups:

CASE A: III

CASE B: III

CASE C: III

14.5 Environmental danger:

Environmentally dangerous substance in compliance with ADR, RID, ADN and IMDG codes.

Marine pollution (P) in compliance with the IMDG code

14.6 Special precautions for users (transport operations):

Make sure that transfer of the material takes place in contained and extracting ventilation conditions. Wear protective gloves against chemical agents (conforming to the EN374 standard), accompanied by a basic training course.

14.7 Bulk transport in compliance with annex II of MARPOL 73/78 and IBC code

If you intend carrying out bulk transportation, comply with annex II of MARPOL 73/78 and IBC code where they are applicable.

14.8 Further information

Tunnel restriction code (ADR):

CASE A: D/E

CASE B: D

CASE C: E

15 Regulation Information

15.1 Specific standards and legislation on health, safety and environment for the substance or mixture

Authorization in compliance with REACH Regulation (EC Regulation n° 1907/2006 and subsequent amendments and additions): The product does not appear in the list of substances of very high concern (SVHC) which are candidates for authorization.

Restrictions on use in compliance with REACH Regulations (EC Regulation n° 1907/2006 and subsequent amendments and additions): The substance is subjected to Restrictions in compliance with Heading VIII (Annex XVII, Appendix 2, point 28)

Other EU regulations and national implementations:

Seveso Category (Directive 96/82/EC and Directive 105/2003/EC and Leg. Decree 334/99 and subsequent amendments and additions): Annex I part 2 group 9i

Dangerous chemical agent in compliance with Directive 98/24/EC and Chapter I, Heading IX of Leg. Decree 81/08 and subsequent amendments and additions.

Carcinogenic agent in compliance with Directives 97/42/EC and 99/38/EC and Chapter I, Heading IX of Leg. Decree 81/08 and subsequent amendments and additions.

15.2 Evaluation of chemical safety

An evaluation was carried out regarding chemical safety

16 Further information:

List of pertinent phrases:

These phrases are stated for information and do not necessarily correspond to the product classification

R phrases

- R20: Harmful by inhalation
- R45: May cause cancer.
- R48/21: Harmful: danger of serious damage to health by prolonged exposure in contact with skin
- R63: Possible risk of harm to the unborn child
- R66: Repeated exposure may cause skin dryness or cracking
- R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Danger indications

- H332: Harmful if inhaled
- H350: May cause cancer.
- H361d: Suspected of damaging fertility or the unborn child
- H373: May cause damage to organs through prolonged and repeated exposure.
- H410: Very toxic to aquatic life with long lasting effects.
- EU H066 Repeated exposure may cause skin dryness or cracking

Training indications:

Adequately train workers who are potentially exposed to this substance based on the contents of this safety schedule.

Main bibliographical references and data sources: Registration Dossier

Abbreviation and acronym legend:

ACGIH	=	American Conference of Governmental Industrial Hygienists
CSR	=	Chemical Safety Report
DNEL	=	Derived No Effect Level
DMEL	=	Derived Minimal Effect Level
EC50	=	Medial Effective Concentration
IC50	=	Inhibition Concentration, 50%
LC50	=	Lethal Concentration, 50%
LD50	=	Average Lethal Dose
PNEC	=	Predicted No Effect Concentration
n.a.	=	Not applicable
n.d.	=	Not available
PBT	=	Persistent, Bioaccumulable and Toxic Substance
CNS	=	Central Nervous System
STOT	=	Specific Toxicity for Organ Targets
(STOT) RE	=	Repeated Exposure
(STOT) SE	=	Single Exposure



SAFETY SCHEDULE – FUEL OIL

conforms to EC Regulation n° 1907/2006 and subsequent amendments and additions

TLV®TWA	=	Threshold Limit Value – Time Weighed Average
TLV®STEL	=	Threshold Limit Value – Short Time Exposure Limit
UVCB	=	Unknown or Variable Composition Substance
vPvB	=	Very Persistent and Very Bioaccumulable

Note H = Classification and labelling indicated for this substance relate to the dangerous property or properties specified by the danger indication or indications combined with the danger class or classes and the indicated category or categories. The dispositions of article 4 relating to producers, importers or users of this substance, are applied to all danger classes and categories. In relation to the danger classes for which the exposure or nature of the effects determines a differentiation of the classification of the danger class, the producer, importer or user must consider the exposure or nature of the effects that have not yet been considered.