



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

1.1 Product identifier

The table contains identifiers (names and identification numbers) of the product which is marketed under the following business name:

**PYROLYSIS FUEL OIL**

| DATA SOURCE FOR IDENTIFICATION                       | IDENTIFIERS   |   |
|--|---|---|
|  | NAME OF SUBSTANCE   | IDENTIFICATION NO.                                |
| Registration in accordance with REACH Regulation     | <b>Name on registration:</b><br>Residues (petroleum), steam-cracked<br>(LOA Category G) | <b>registration no.:</b><br>01-2119485585-24-0009 |
| List of harmonized classifications (Annex VI of CLP) | <b>Name in the list:</b><br>Residues (petroleum), steam-cracked                         | <b>index no.:</b><br>649-018-00-6                 |
| ECHA database of classifications and labels          | Heavy Fuel oil<br>Residues (petroleum), steam-cracked                                   | -   |
| Other sources  | <b>International chemical name:</b><br>Residues (petroleum), steam-cracked              | <b>CAS:</b> 64742-90-1<br><b>EC:</b> 265-193-8    |

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

1.2.1 Identified use

Chemical intermediate for the production of chemical products, industrial fuel.

1.2.2 Non-recommended use

The registration documentation contains no non-recommended use.

1.3 Details of the supplier of the safety data sheet

- UNIPETROL RPA, s.r.o., Záluží 1, 436 70 Litvínov, Czech Republic

☎: +420 476 161 111 fax: +420 476 619 553

[unipetrolrpa@unipetrol.cz](mailto:unipetrolrpa@unipetrol.cz)

[www.unipetrolrpa.cz](http://www.unipetrolrpa.cz)

- Director of the Trade Unit Refinery: ☎: +420 225 001 659

[Adam.Jaros@orlen.pl](mailto:Adam.Jaros@orlen.pl)

- Sales manager ORP: ☎: +420 476 166 458

[Vitezslav.Hobrlant@unipetrol.cz](mailto:Vitezslav.Hobrlant@unipetrol.cz)

- Seller: ☎: +420 476 166 457

[Vladimira.Molnarova@unipetrol.cz](mailto:Vladimira.Molnarova@unipetrol.cz)

- Person competent for SDS

[reach.unirpa@unipetrol.cz](mailto:reach.unirpa@unipetrol.cz)

1.4 Emergency phone numbers

- UNIPETROL RPA, s.r.o. ☎: +420 476 163 111 (nonstop)

- MINISTRY OF HEALTH CENTER

Toxicology Information Center (TIC) ☎: +420 224 919 293 (nonstop)

Na bojišti 1, 120 00 Prague 2, Czech Republic ☎: +420 224 915 402 (nonstop)

e-mail: [tis@vfn.cz](mailto:tis@vfn.cz)

## SECTION 2: HAZARD IDENTIFICATION

### 2.1 Classification of the substance or mixture




The European Union harmonically classifies this product as hazardous based on its classification and labeling record in Part 3 of Appendix VI of Regulation (EC) No. 1272/2008 CLP.

CARCINOGENIC (CATEGORY 1B))  
 SKIN CORROSION/IRRITATION (CATEGORY 2)  
 HAZARDOUS TO THE AQUATIC ENVIRONMENT (CATEGORY 2)

|                                 |
|---------------------------------|
| <b>Carc. 1B, H 350</b>          |
| <b>Skin Irrit 2, H 315</b>      |
| <b>Aquatic Chronic 2, H 411</b> |

*Note: Full wording of H- and EUH-phrases is stated in Section 16*

### 2.2 Label elements

|   |  |
|---|--|
| <i>Product identifiers</i>  | <b>PYROLYSIS FUEL OIL</b><br>RESIDUES (PETROLEUM), STEAM-CRACKED<br>Index number: 649-018-00-6   |
| <i>Hazard pictogram(s)</i>  | <br>GHS08 <br>GHS07 <br>GHS09   |
| <i>Signal word</i>  | DANGER   |
| <i>hazard statements (H-phrases)</i>  | H315<br>H350<br>H411<br>Causes skin irritation.<br>May cause cancer.<br>Toxic to aquatic life with long lasting effects.   |
| <i>precautionary statements (P-phrases)</i>   | P202<br>P273<br>P280<br>P302+P352<br>P332+P313<br>P391<br>Do not handle until all safety precautions have been read and understood.<br>Avoid release to the environment.<br>Wear protective gloves/protective clothing/eye protection/face protection.<br>IF ON SKIN: Wash with plenty of soap and water.<br>If skin irritation occurs: Get medical advice/attention.<br>Collect spillage. |
| UNIPETROL RPA, s.r.o.<br>Záluží 1, 436 70 Litvínov, Czech Republic<br>☎: +420 476 161 111, +420 476 163 111 |  |

### 2.3 Other hazards

The product is flammable. It can ignite if heated above the temperature of the ignition point. Its vapors are heavier than air and they therefore accumulate by the ground. Inhaling high concentrations of the vapors can irritate breathing airways, cause headaches, dizziness and sleepiness. Repeated skin exposition can cause the skin to dry and crack and increase therefore a chance of skin diseases. Touching a hot (heated) product can result in burns.

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

|   |  |  |
|---|--|--|
| Substance name:   | Pyrolysis fuel oil<br>(other names – see subsection 1.1) |  |
| Index number:   | 649-018-00-6   |  |
| CAS number:   | 64742-90-1   |  |
| EC number:  | 265-193-8  |  |
| <i>this UVCB substance contains the following components</i> <ul style="list-style-type: none"> <li>• in a concentration of <math>\geq 10\%</math> or</li> <li>• influencing the classification of this substance:</li> </ul> | NAME :   | IDENTIFIER :   |
|   | <i>naphthalene</i>                                       | <i>naphthalene (index 601-052-00-2, CAS 91-20-3, EC 202-049-5)</i>   |
|   | <i>biphenyl</i>  | <i>biphenyl; diphenyl (index 601-042-00-8, CAS 92-52-4, EC 202-163-5)</i>  |
|   | <i>methylnaphthalenes</i>                                | <i>methylnaphthalenes (CAS 1321-94-4, EC 215-329-7)</i>  |
|   | <i>polycyclic aromatic hydrocarbons</i>                  | <i>phenanthrene (CAS 85-01-8, EC 201-581-5)<br/>anthracene (CAS 120-12-78, EC 204-371-1)<br/>fluoranthene (CAS 206-44-0, EC 205-912-4)<br/>pyrene (CAS 129-00-0, EC 204-927-3)</i> |

### SECTION 4: FIRST AID MEASURES

#### 4.1 Description of first aid measures

##### 4.1.1 General instructions

Ensure the operation of vital functions. In case of danger of loss of consciousness, move the patient into the stabilized position. Never give anything orally to unconscious individuals.

##### 4.1.2 In case of inhalation

Transport the victim to fresh air, do not let them get cold and secure professional medical help.

##### 4.1.3 In case of skin contact

Remove contaminated clothing and shoes. Thoroughly wash the affected areas with water (ideally tepid) and soap. If symptoms persist, secure professional medical help.

Shall there be any burns, do not remove the product, cover the affected area using a sterilized bandage (or a clean piece of fabric) and immediately secure professional medical help.

##### 4.1.4 In case of eye contact

Immediately start washing wide open eyes under flowing tepid water and continue for at least 15 minutes. If the patient has contact lenses, remove them before washing his/her eyes. Secure professional medical help.

##### 4.1.5 In case if swallowed

**DO NOT INDUCE VOMITING!** If the patient is vomiting on his/her own, keep his/her head below his/her hips to prevent him/her from inhaling his/her own vomit. Secure professional medical help as soon as possible.

#### 4.2 Most important symptoms and effects, both acute and delayed

Based on the exposure dose, the substance may cause headaches, sore throat, coughing, breathing difficulties, chest pressure, disruptions of the central nervous system, nausea, sleepiness and dizziness. Consumption may lead to abdomen spasms, spontaneous vomiting and diarrhea. Direct contact with eyes or skin may cause irritation and the affected area can turn red; swelling and tearing can also occur. Prolonged skin exposure to the substance may dry the skin and cause its cracking.

#### 4.3 Indication of any immediate medical attention and special treatment needed

In case of consumption or burns, immediate medical assistance is necessary. If gastric lavage is necessary, it may be performed only by a qualified doctor via endotracheal intubation and, after the procedure, the victim has to be continuously monitored for 48-72 hours.

We recommend the workplace to be equipped with a safety shower and a device for washing eyes.

### SECTION 5: FIRE FIGHTING MEASURES

#### 5.1 Extinguishing media

Suitable extinguishing media: heavy foam, water spray or mist.

Unsuitable extinguishing media: direct water stream.

Extinguishing small fires: powder or foam extinguishers, dry sand or extinguishing foam.

#### 5.2 Special hazards arising from the substance or mixture

The vapors are heavier than air. They accumulate and spread near the ground and, in the case of a leak, may ignite fire or cause explosion even far from the source. This danger is imminent especially in places below the ground or in enclosed areas. Toxic or irritating vapors containing monoxide, carbon dioxide or unburned hydrocarbons might be produced during burning.

#### 5.3 Advice for fire fighters

Minimize the penetration of extinguishing medium contaminated by the substance into the sewage, surface or underground waters or into the soil.

Use water spray to keep the containers with the substance cool in order to prevent an explosion caused by the heat.

Do not use foam and water at the same time because water dissolves the foam.

Protective equipment for fire fighters: full protective gear and self-contained close-circuit breathing apparatus.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

#### 6.1 Personal precautions, protective equipment and emergency procedures

Seal off the place and prevent access to the endangered area. Remain on the windward side. There is a danger of fire in case of accidental leaks of this substance, therefore remove all possible ignition sources, do not smoke and do not manipulate with open fire. If possible, ensure a sufficient ventilation of enclosed spaces. Prevent contact with the substance and its vapors. Use all recommended personal protective equipment (as indicated in Subsection 8.2) when removing the effects of the emergency event/accident. In the case of large-scale accidents, evacuate people from the entire endangered area. There is a danger of vapors explosion in case of substance initiation in places below the ground or in enclosed places (including sewage).

#### 6.2 Environment precautions

Prevent further leaking and seal off the leaking place. Prevent leakage of the substance into the sewage, surface and underground waters by covering sewage inlets. Inform the relevant authorities if rivers, lakes or sewage systems have been contaminated during the leak.

#### 6.3 Methods and material for containment and cleaning up

In the case of a leak of this product, there is a danger of fire; therefore only explosion-proof lights and electrical equipment and non-sparking tools must be used. Absorb the remains into a suitable non-flammable porous/absorbent material (e.g. sand, dirt, siliceous earth, vermiculite) and transport them for disposal in sealed containers. Dispose the substance in accordance with valid legal regulations related to waste (see Section 13). For large leaks into water, use floating barrage and collect the substance from surface using surface skimmers (separators) or cover the leaked substance with sorbent and remove saturated sorbent from the surface by scraping or exhausting. Consult experts prior to using any dispersing agents.

#### 6.4 References to other Sections

For recommended personal protective equipment, see Subsection 8.2 (“Limiting exposure”).  
 For recommended waste disposal see Section 13 (“Disposal considerations”).

### SECTION 7: HANDLING AND STORAGE

#### 7.1 Safe handling instructions

Adhere to all fire safety precautions (no smoking, no open fire, removal of all possible combustion sources) and stay in well-ventilated areas when handling the substance as well as empty containers (may contain residue). Do not perform activities such as welding, cutting, grinding etc. near containers (even empty ones). Do not use compressed air for emptying, filling or any other handling. Prevent bolts of static electricity. Comply with the rules of personal hygiene. Take off contaminated pieces of clothing immediately. Do not eat, drink or smoke when working! Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and, if necessary, apply suitable repair lotion. Do not wear contaminated clothing, shoes or protective equipment in the catering area.

#### 7.2 Conditions for safe storage, including any incompatibilities

Storage must comply with the fire safety requirements related to buildings. Electric equipment must comply with the valid legal regulations. Store in cool, well-ventilated places with an efficient exhaust system, away from all heat and combustion sources. Storage containers must be closed, properly labeled and grounded. Recommended material suitable for containers is soft or stainless steel. Do not store near incompatible materials, such as oxidizers (oxygen, air etc.) or other flammable materials.

#### 7.3 Specific end use(s)

The substance is not designated for specific use, which would be subject to certain special recommendations. It is necessary to adhere to the instructions listed in Subsections 7.1 and 7.2 when handling and during storage.

### SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

#### 8.1 Control parameters

Exposure limits at workplaces

Two exposure limits are specified for workplaces:

- a/ Exposure to which employees can be exposed during the entire work shift (8 hours) without endangering his/her health even after a lifetime at the given workplace (PEL, 8-hour limit);
- b/ Concentration of the substance to which employees must never be exposed (NPK-P) or may only be exposed for a exactly defined period of time (short time limit).

| Czech Republic (Government Directive No. 361/2007 Coll.) | PEL<br>[mg.m <sup>-3</sup> ]  | NPK-P<br>[mg.m <sup>-3</sup> ] |                                  |
|--|---|--------------------------------|----------------------------------|
| Name: see Chapter 1.1                                    | <b>Limit values for the substance are not specified</b><br><i>It is recommended to comply with the limits specified for individual components, present in this substance:</i> |                                |                                  |
| Index number: 649-018-00-6                               |   |                                |                                  |
| CAS number : 64742-90-1                                  |   |                                |                                  |
| EC number : 265-193-8                                    |   |                                |                                  |
| <i>Substance components :</i>                            | <i>NAME:</i>  | <i>PEL [mg.m<sup>-3</sup>]</i> | <i>NPK-P [mg.m<sup>-3</sup>]</i> |
|  | <i>biphenyl</i>   | <i>1</i>                       | <i>3</i>                         |
|  | <i>naphthalene</i>  | <i>50</i>                      | <i>100</i>                       |

PEL: acceptable exposure limit of the chemical substance in the air

NPK-P: highest allowed concentration of the chemical substance in the air



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| European Union (Directive 2000/39/EC) | 8-hour limit [mg.m <sup>-3</sup> ]  | short-term limit [mg.m <sup>-3</sup> ] |
|---------------------------------------|---|--|
| Name: see Chapter 1.1                 | <b>Limit values for the substance are not specified</b><br><i>It is recommended to comply with the limits specified for individual components, present in this substance:</i> |  |
| Index number: 649-018-00-6            |   |  |
| CAS number : 64742-90-1               |   |  |
| EC number : 265-193-8                 |   |  |

| Substance components : | NAME:       | 8-hour limit [mg.m <sup>-3</sup> ] | short-term limit [mg.m <sup>-3</sup> ] |
|------------------------|-------------|------------------------------------|--|
|                        | naphthalene | 50                                 | not specified                          |

8-hour limit: measured or calculated in relation to the reference period of eight hours as a time-weighted average

Short-term limit: limit that should not be exceeded during exposure, corresponding to 15 minutes

| Poland                     | 8-hour limit [mg.m <sup>-3</sup> ]  | short-term limit [mg.m <sup>-3</sup> ] |
|----------------------------|---|--|
| Name: see Chapter 1.1      | <b>Limit values for the substance are not specified</b><br><i>It is recommended to comply with the limits specified for individual components, present in this substance:</i> |  |
| Index number: 649-018-00-6 |   |  |
| CAS number : 64742-90-1    |   |  |
| EC number : 265-193-8      |   |  |

| Substance components : | NAME:       | 8-hour limit [mg.m <sup>-3</sup> ] | short-term limit [mg.m <sup>-3</sup> ] |
|------------------------|-------------|------------------------------------|--|
|                        | biphenyl    | 1                                  | 3                                      |
|                        | naphthalene | 20                                 | 75                                     |

8-hour limit: measured or calculated in relation to the reference period of eight hours as a time-weighted average

Short-term limit: limit that should not be exceeded during exposure, corresponding to 15 minutes

| Germany                    | 8-hour limit [mg.m <sup>-3</sup> ]  | short-term limit [mg.m <sup>-3</sup> ] |
|----------------------------|---|--|
| Name: see Chapter 1.1      | <b>Limit values for the substance are not specified</b><br><i>It is recommended to comply with the limits specified for individual components, present in this substance:</i> |  |
| Index number: 649-018-00-6 |   |  |
| CAS number : 64742-90-1    |   |  |
| EC number : 265-193-8      |   |  |

| Substance components : | NAME:                           | 8-hour limit [mg.m <sup>-3</sup> ] | short-term limit [mg.m <sup>-3</sup> ] |
|------------------------|---------------------------------|------------------------------------|--|
|                        | naphthalene (inhalable aerosol) | 0.5                                | 0.5                                    |

8-hour limit: measured or calculated in relation to the reference period of eight hours as a time-weighted average

Short-term limit: limit that should not be exceeded during exposure, corresponding to 15 minutes

| Hungary                    | 8-hour limit [mg.m <sup>-3</sup> ]  | short-term limit [mg.m <sup>-3</sup> ] |
|----------------------------|---|--|
| Name: see Chapter 1.1      | <b>Limit values for the substance are not specified</b><br><i>It is recommended to comply with the limits specified for individual components, present in this substance:</i> |  |
| Index number: 649-018-00-6 |   |  |
| CAS number : 64742-90-1    |   |  |
| EC number : 265-193-8      |   |  |

| Substance components : | NAME:       | 8-hour limit [mg.m <sup>-3</sup> ] | short-term limit [mg.m <sup>-3</sup> ] |
|------------------------|-------------|------------------------------------|--|
|                        | biphenyl    | 1                                  | not specified                          |
|                        | naphthalene | 50                                 | not specified                          |

8-hour limit: measured or calculated in relation to the reference period of eight hours as a time-weighted average

Short-term limit: limit value that should not be exceeded during exposure, corresponding to 15 minutes

#### DNEL/DMEL Values

The DNEL value is the level of exposure derived from toxicological data where no detrimental effects on the health of people occur.

For non-threshold effects, the basic presumption is that no level (of exposure) exists without effects and DMEL thus represents the level of exposure corresponding to low and perhaps theoretical risk, which could be considered an acceptable risk.

| EXPOSURE OF WORKERS / EMPLOYEES |            |           |   | EXPOSURE OF GENERAL POPULATION / CONSUMERS |            |           |   |
|---------------------------------|------------|-----------|---|--|------------|-----------|---|
| EXPOSURE                        | EFFECTS    | EXPOSURE  | EFFECTS   | EXPOSURE                                   | EFFECTS    | EXPOSURE  | EFFECTS   |
| acute                           | systematic | skin      | non-threshold effect and/or no data on reaction to a dose | acute                                      | systematic | skin      | non-threshold effect and/or no data on reaction to a dose |
| acute                           | systematic | breathing |   | acute                                      | systematic | breathing |   |
| /                               | /          | /         |   | acute                                      | systematic | mouth     |   |
| acute                           | local      | skin      | non-threshold effect and/or no data on reaction to a dose | acute                                      | local      | skin      | non-threshold effect and/or no data on reaction to a dose |
| acute                           | local      | breathing |   | acute                                      | local      | breathing |   |
| long-term                       | systematic | skin      | DMEL<br>23.4 mg/kg of live weight/day                     | long-term                                  | systematic | skin      | DMEL<br>42.4 mg/kg of live weight/day                     |
| long-term                       | systematic | breathing | DMEL<br>3.25 mg.m <sup>-3</sup>                           | long-term                                  | systematic | breathing | DMEL<br>14.7 mg.m <sup>-3</sup>                           |
| /                               | /          | /         | /   | long-term                                  | systematic | mouth     | DMEL<br>4.23 mg/kg of live weight/day                     |
| long-term                       | local      | skin      | non-threshold effect and/or no data on reaction to a dose | long-term                                  | local      | skin      | non-threshold effect and/or no data on reaction to a dose |
| long-term                       | local      | breathing |   | long-term                                  | local      | breathing |   |

Note: There is not enough information to determine the dermal, inhalation (or oral) DNEL/DMEL values for acute systemic and local effects and long-term effects. Hazard characterization is focused on the possibility to trigger serious long-term system effects.

#### PNEC values

The PNEC value is the estimated concentration for which there are no hazardous effects in the given environment component.

Determination of concrete PNEC values based on experimental data obtained by testing water fractions containing dissolved/emulsified/suspended shares of the tested substance (WAF) is not suitable for UVCB substances of the hydrocarbon type. The risk characterization of the product for the environment was thus determined statistically, using the hydrocarbon block method of extrapolating HC5 with the PETROTOX model, v.3.05.

Recommended procedure for monitoring concentrations in the work environment: gas chromatography (GC) with a flame ionizing detector (FID) or a mass spectrometer (MS) in accordance with technical norms ČSN EN 689 and ČSN EN 482.

#### 8.2 Exposure controls

Technical protective measures to prevent exposure of people and the environment

Protective measures against exposure must be ensured by strictly keeping the substance under control by using process and control technologies, which reduce emissions and subsequent exposure with the goal of preventing the substance from entering the air and water systems as well as the soil, and of preventing possible human exposure. The areas where the substance is stored and handled must be equipped with impermeable floors and retaining tanks in case of emergency leaks. It is necessary to ensure global as well as local ventilation and efficient exhaustion.



**Individual protective measures**

In case of danger of increased exposure due to product handling or due to other events, such as an accident or emergency, employees must have personal protective measures (PPM) available for the protection of airways, eyes, hands and skin, corresponding to the nature of the performed activities. Suitable protection for airways must also be available where it is not technically possible to ensure compliance with exposure limits designated for the work environment or ensure that exposure via airways will not affect the health of people. During non-stop use of these measures during permanent work, it is necessary to include safety breaks if the nature of the PPM requires them. All PPM need to be kept in usable condition and damaged or contaminated ones need to be immediately replaced.

**RECOMMENDED PERSONAL PROTECTIVE MEASURES (PPM):**

- **Protecting airways:** For leaks - protective breathing mask with a filter efficient against the effects of organic vapors; insulation breathing device for removing the consequences of extraordinary events
- **Protecting eyes / face:** Protective glasses
- **Protecting skin - hands** Protective gloves

|  | <i>Glove material</i> | <i>Layer width</i> | <i>Time of penetration</i> |
|--|-----------------------|--------------------|----------------------------|
| General work activity (possibility of contamination) | Natural latex         | 1 mm               | 120 minutes                |
| Cleaning after leaks / emergencies                   | Nitrile               | 0.4 mm             | 480 minutes                |

- **Protecting other body parts:** Antistatic non-flammable protective clothing, antistatic shoes
- **Heat danger:** Not relevant for the designated manner of use
- **Other precautions:** We recommend the workplace to be equipped with a safety shower and a device for washing eyes.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**
**9.1 Information on basic physical and chemical properties**

| PROPERTY                                    | UNIT                           | VALUE   | REMARK  |
|---|--------------------------------|---|---|
| Appearance                                  |                                | Dark brown to black viscid liquid   |   |
| Odour                                       |                                | Characteristic, crude-oil like  |   |
| Odour threshold value                       | [ppm]<br>[mg.m <sup>-3</sup> ] | <i>Research data for the substance components:</i><br>0.084 (naphthalene)<br>0.0062-0.3 (biphenyl)        |   |
| pH  |                                | Not relevant  |   |
| Melting point / solidification point        | [°C]                           | -63 to +43<br><i>Research data for the substance components:</i><br>+69 (biphenyl)<br>+80.2 (naphthalene) | The value is influenced by a variable composition of the UVCB substance |
| Initial boiling point / boiling point range | [°C]                           | Approximately 200-246   | Beginning of distillation ČSN EN ISO 3405                               |
| Ignition point                              |                                | Min. 101  | ČSN EN ISO 2592   |
| Evaporation speed                           | Butyl acetate=1                | <i>Research data for the substance components:</i><br>< 1 (naphthalene)                                   |   |
| Flammability                                |                                | Determining flammability for liquids is not relevant  |   |



| PROPERTY                             | UNIT                                | VALUE   | REMARK  |
|--------------------------------------|-------------------------------------|---|---|
| Upper explosion limit                |                                     | Not specified   | For technical reasons, the measurements of the characteristics at the upper explosion limit could not be finished (the liquid was evaporating very badly) |
| Lower explosion limit                | [mg.m <sup>-3</sup> ]               | 400   | At 130°C<br>ČSN ISO 6184-3  |
| Vapor pressure                       | [Pa]<br>[Pa]<br>[mm Hg]             | 211-2 592<br>750-5 150<br><i>Research data for the substance components:</i><br>0.05 (biphenyl)<br>0.08 (naphthalene)           | At 19.9-25°C<br>At 50°C<br>At 25°C  |
| Vapor density                        | Air=1                               | UVCB vapors are heavier than air<br><i>Research data for the substance components:</i><br>5.31 (biphenyl)<br>4.42 (naphthalene) | Air=1   |
| Relative density                     | [kg.m <sup>-3</sup> ]               | Max. 1 150  | At 15°C<br>ČSN EN ISO 3675  |
| Solubility in water                  | [g.l <sup>-1</sup> ]                | 0.035-0.16  | Most UVCB components are not dissolvable in water   |
| Division coefficient: n-octane/water | [log Kow]                           | > 3 to < 6.5  |   |
| Spontaneous ignition temperature     | [°C]                                | > 450   | ČSN 33 0371   |
| Breakdown temperature                |                                     | Does not break down under normal usage temperature  |   |
| Kinematic viscosity                  | [mm <sup>2</sup> .s <sup>-1</sup> ] | > 3 820   | At 40°C<br>ČSN EN ISO 3104  |
| Explosive characteristics            |                                     | Substance is not explosive  |   |
| Oxidation characteristics            |                                     | None  |   |

## 9.2 Other information

Not required.

## SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

No threat of reactivity during storage and handling under the conditions listed in Section 7.

### 10.2 Chemical stability

The product is chemically stable when handled and stored under the conditions listed in Section 7.

### 10.3 Possibility of hazardous reactions

No threat of dangerous reactions during storage and handling under the conditions listed in Section 7.

## 10.4 Conditions to avoid

Ignition sources (including static electricity), high temperature, creation of explosive mixtures with air.

## 10.5 Incompatible materials

Oxidizers.

## 10.6 Hazardous decomposition products

Heat decomposition at high temperatures, e.g. during fires, may create carbon monoxide.

**SECTION 11: TOXICOLOGICAL INFORMATION**

## 11.1 Information of toxicological effects

## 11.1.1 Substance

| HAZARD CLASS                      | EFFECT ON HEALTH  | JUSTIFICATION  |
|-----------------------------------|---|--|
| Acute toxicity                    | Based on available information, there is no need to classify the substance for acute toxic effects on the health of people after inhalation, consumption or skin penetration<br><br><i>Acute toxicity</i><br><i>oral: the UVCB substance is not dangerous if it contains &lt;25% of naphthalene</i><br><i>dermal: low toxicity, does not require classification</i><br><i>inhalation: low toxicity, does not require classification</i> | Data from the registration documentation   |
| Skin corrosion/irritation         | skin irritant<br>irritating<br>unsubstantiated<br>unsubstantiated<br>irritating   | Data from the registration documentation: available data for humans and animals assessing caustic or acidic reserve in vitro study in vivo study |
| Serious eye damage / irritation   | Based on available information, there is no need to classify the substance as a substance that can seriously damage or irritate eyes<br><br><i>The UVCB substance does not irritate eyes if it contains &lt;10% of benzene and/or styrene</i><br><br>unsubstantiated<br>unsubstantiated   | Data from the registration documentation: available data for humans and animals assessing caustic or acidic reserve in vitro study in vivo study |
| Respiratory or skin sensitisation | Based on available information, the substance does not cause allergic reactions and that is why it does not need to be classified as sensitizing<br><br>non-sensitizing   | Data from the registration documentation: available data for humans and animals in vivo study  |

| HAZARD CLASS  | EFFECT ON HEALTH   | JUSTIFICATION   |
|---|--|---|
|   | <i>non-sensitizing</i>   |   |
| Germ cell mutagenicity                              | Based on available information, the substance does not need to be classified as a substance that causes hereditary genetic changes<br><br><i>No adverse genotoxic effects have been recorded, provided that the UVCB substance contains &lt;0.1% of benzene</i>  | Data from the registration documentation:<br><i>in vitro study</i><br><i>in vivo study</i>  |
| Carcinogenicity                                     | Causes cancer  | Harmonized classification pursuant to Appendix VI of Directive (EC) No. 1272/2008 CLP   |
| Reproductive toxicity                               | Based on available information, the substance does not need to be classified as a substance that can have adverse impact on fertility or embryo development<br><br><i>No adverse reproduction effects have been recorded, provided that the UVCB substance contains &lt;3% of toluene</i>                    | Data from the registration documentation:<br><i>fertility</i><br><i>prenatal development toxicity</i>   |
| Specific target organ toxicity - single exposure    | Based on available information, the substance does not need to be classified as a substance that can damage human organs upon a single exposure<br><br><i>No adverse effects have been recorded, provided that the UVCB substance contains &lt;20% of toluene or &lt;20% of biphenyl</i>                     | Data from the registration documentation  |
| Specific target organ toxicity - repeated exposures | Based on available information, the substance does not need to be classified as a substance that can damage human organs upon repeated exposures<br><br><i>No adverse effects have been recorded, provided that the UVCB substance contains &lt;1% of benzene, &lt;10% of styrene and &lt;10% of toluene</i> | Data from the registration documentation  |
| Aspiration hazard                                   | Based on available information, the substance does not damage lungs and does not cause death upon penetrating into human airways   | The UVCB substance does not meet the conditions for being specified as dangerous upon inhaling – i.e. the substance in question is a hydrocarbon with kinematic viscosity > 20.5 mm <sup>2</sup> .s <sup>-1</sup> at 40°C |

#### 11.1.2 Information about the probable exposure ways

Exposure may occur via inhalation, random consumption or by penetrating through skin.

#### 11.1.3 Symptoms and effects (acute, delayed and chronic after a short-time and long-time exposure)

Based on the exposure dose, the substance may cause headaches, sore throat, coughing, breathing difficulties, chest pressure, disruptions of the central nervous system, nausea, sleepiness and dizziness. Consumption may lead to abdomen spasms, spontaneous vomiting and diarrhea. Direct contact with eyes or skin may cause irritation and the affected area can turn red; swelling and tearing can also occur. Prolonged skin exposure to the substance may dry the skin and cause its cracking. The substance can cause cancer.

Handling hot (heated) product can result in burns, causing aching skin that turns red and, in more serious cases, blisters can develop.

#### 11.1.4 Interactive effects

There are no interactions for the designated use.

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1 Toxicity

#### TOXICITY FOR WATER ENVIRONMENT:

Subacute toxicity on invertebrates: EC50, 48 hours: 1.2-2.7 mg.l<sup>-1</sup> (*Daphnia*)

Study of water plants growth inhibition: EC50, 72 hours.: 1.6-12.2 mg.l<sup>-1</sup>

Subacute toxicity on fish: LC50, 96 hours: 1-220 mg.l<sup>-1</sup>

Inhibition test of the activated sludge respiration: EC10, 180 min.: 220 mg.l<sup>-1</sup> (nominal)

### 12.2 Persistence and degradability

Biological decomposability: The product is not easily biologically decomposable.

Abiotic decomposability:

- Hydrolysis as a function of pH: It is not expected that the product is affected by hydrolysis;
- Photolysis: It is not expected that the product is affected by photolysis;
- Atmospheric oxidation: Fast decomposition through indirect photolysis in the air is expected.

### 12.3 Bioaccumulation potential

Because the value of distribution coefficient n-octane/water (log Kow) determined for individual components is within the range 3-6 and the calculated bioconcentrations BCF factor is between 39 and 18 220, the product's potential for bioaccumulation cannot be exactly confirmed. It is only possible to conclude that some of the included components are not bioaccumulative, while others have a smaller or greater potential for bioaccumulation.

### 12.4 Mobility in soil

A log Koc values have been calculated for the eight components contained in the product. This value is between 2.44 and 4.55. It means that we can expect medium to strong sorption of individual components in the soil.

### 12.5 Results of PBT and vPvB assessment

This UVCB hydrocarbon substance should not be compared according to the criteria in Appendix XIII of EC Regulation No 1907/2006 REACH as a whole. Thus an assessment of the contained components was carried out with a conclusion that the product does not fulfill the criteria for persistent, bioaccumulative and toxic substances or the criteria for very persistent and very bioaccumulative substances in accordance with Appendix XIII of EC Regulation No 1907/2006 REACH, and it is not therefore identified as a PBT substance (Persistent, Bioaccumulative, Toxic) or a vPvB substance (very Persistent, very Bioaccumulative).

### 12.6 Other adverse effects

Pursuant to Appendix 1 of Act No. 254/2001 Coll. (the Water Act), the product is considered a hazardous harmful substance.

**SECTION 13: DISPOSAL CONSIDERATION**

## 13.1 Waste treatment methods

If the product becomes waste, e.g. due to an accident or emergency, it is necessary to adhere to regulations valid in the EU as well as to the appropriate local and national regulations. The waste shall be disposed by professionals.

## 13.1.1 Recommended waste classification according to Decree No. 381/2001 Coll. (Waste Catalogue)

Catalogue number for products that have become waste:

07 01 04\* Other organic solvents, washing liquids and mother liquors.

16 03 05\* Organic waste containing dangerous substances.

Catalogue number for leaked products absorbed into an absorption agent (e.g. vapex):

15 02 02\* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances.

Catalogue number for soil contaminated by leaked product:

17 05 03\* Soil and stones containing dangerous substances.

## 13.1.2 Recommended methods of waste disposal

Hand the waste for disposal to authorized professionals.

Energy utilization (burning).

Landfill and biodegradation for soil contaminated by leaked product.

## 13.1.3 Recommended methods for disposing contaminated containers

Not relevant. The product is not packaged, it is transported by railway tank cars.

## 13.1.4 Measures for limiting exposure when handling waste

Do not flush leaked product during an emergency event or accident into sewage. Proceed in accordance with instructions provided in Section 6 (“Measures for accidental leaks”) and in Subsection 8.2 (“Limiting exposure”) and adhere to all valid legal regulations for the protection of people, air and water.

**SECTION 14: TRANSPORT INFORMATION**

Information on transport classification is stated in accordance with the following UN Model Regulations:

European Agreement Concerning the International Carriage of Dangerous Goods (ADR),

International Carriage of Dangerous Goods by Rail (RID).

- 14.1 UN number 3256
- 14.2 UN proper shipping name: ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.  
with flashpoint above 61°C, with temperature below 90°C
- 14.3 Transport hazard class/classes: 3
- 14.4 Packing group: III
- 14.5 Environmental hazards: The product is hazardous to the environment in accordance with the criteria stated in the UN Model Regulations
- 14.6 Special precautions for users: None
- 14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: The product is not intended to be carried in bulk in accordance with the International Maritime Organization (IMO) documents
- 14.8 Other information
- Hazard identification number: 30
- Classification code: F2
- Safety sign: 3 + label for substances endangering the environment (symbol: fish and tree)

**SECTION 15: REGULATORY INFORMATION**

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

## 15.1.1 European Union

Regulation (EC) No 1907/2006 (REACH) of the European Parliament and of the Council, as amended

REGISTRATION (TITLE II OF REACH REGULATION)

The product was fully registered as a substance.

AUTHORIZATION (TITLE VII OF REACH REGULATION)

The product is not listed in the list of substances in Annex XIV of EC Regulation No 1907/2006 REACH, and so no licensing obligation applies.

RESTRICTION (TITLE VIII OF REACH REGULATION)

It is necessary to adhere to the limitations listed in records no. 3 and 28 of Annex XVII of EC Regulation No 1907/2006 REACH when producing, marketing and using this product.

Regulation (EC) No 1272/2008 (CLP) of the European Parliament and of the Council, as amended

The product has been classified in accordance with the abovementioned regulation. Obligations related to packing and labeling the package of hazardous chemical substance do not apply to the product with regards to the fact that it is not packed upon entering the market.

Regulation (EC) No 689/2008 of the European Parliament and of the Council concerning the export and import of dangerous chemicals, as amended

The product is not subject to special provision for export and import.

Directive 2006/12/EC of the European Parliament and of the Council on waste, as amended

Implemented into Act No 185/2001 Coll. on waste.

EP and Council Directive (EC) no. 2012/18 / EU on the control of major accident hazards involving dangerous substances, as amended

Implemented by Act no. 224/2015 Coll., On prevention of serious accidents caused by dangerous chemicals or mixtures.

## 15.1.2 Czech Republic

Act No. 350/2011 Coll. on Chemical Substances and Chemical Mixtures, as amended

Act No. 258/2000 Coll. on Protection of Public Health, as amended

Act No. 254/2001 Coll., on Waters, as amended

Act No. 201/2012 Coll., on the Protection of the Air, as amended

Act No. 185/2001 Coll., on Waste, as amended

Decree No. 381/2001 Coll., which specifies the Waste Catalogue, as amended

Government Regulation No 361/2007 Coll., determining conditions for occupational health protection, as amended

Act no. 224/2015 Coll., on prevention of serious accidents caused by selected dangerous chemical substances or mixtures, as amended

Notification of the Ministry of Foreign Affairs No. 17/2011 Coll., on the proclamation of accepted changes and amendments to “Appendix A – General stipulations related to dangerous substances and items” and to “Appendix B - Stipulations on the transportation means and on transportation” of the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)

Notification of the Ministry of Foreign Affairs No. 19/2011 Coll., on accepting changes of the Regulations for international carriage of dangerous goods by rail (RID), which forms Appendix C to the Convention Concerning International Carriage by Rail (COTIF)

## 15.2 Chemical safety assessment

Chemical safety assessment has been performed. The substance fulfils the criteria for being classified as dangerous in accordance with EC Regulation No. 1272/2008 CLP. Exposure assessment and following risk characterization have been performed.

**SECTION 16: OTHER INFORMATION**

## Revision changes

- 2/7/2005: Editing information in Chapters 9, 12.5 and 15.2  
12/1/2006: Editing information in Chapters 1, 2, 4, 8, 13 and 16  
3/1/2007: Editing information in Chapters 1 and 16  
6/1/2007: Overall overhaul of the document in relation to EP and EC Directive No. 1907/2006  
12/1/2009: Editing information in Chapters 1, 2.1, 3, 8.1, 15, 16 and “Declaration”  
12/1/2010: Editing information in Chapters 1 (Registration number), 2 (Classification and labeling pursuant to CLP), 3, 14 and 16  
8/1/2011: Overall overhaul of the document in relation to the update of Appendix II of EC Directive No. 1907/2006, REACH, pursuant to Appendix I of EU Directive No. 453/2010  
01/01/2012: Section 15.1.2 – updating legislation  
01/06/2012: Section 1.1 - identifiers, Section 1.3 – update contact and Section 16 – abbreviations  
31/05/2015: Section 1 (contact information), Section 2, Section 15.1 (update of legal regulations) and 16 (text deletion)  
01/11/2016: Section 1 (contact information), Section 14 and 15 (editing in accordance with Regulation (EC) no. 830/2015), Section 15 (legislation update)

## Used abbreviations

- CAS number Registration number assigned to the substance by the Chemical Abstracts Service of the American Chemical Society.
- EC number Official number of the chemical substance in the European Union: EINECS (European Inventory of Existing Commercial Substances), or ELINCS (European List of Notified Chemical Substances), or NLP (No longer polymer list).
- REACH (Regulation) EU Regulation No 1907/2006 on the Registration, Evaluation and Authorization of Chemicals.
- CLP (Regulation) EU Regulation No 1272/2008 on the Classification, Labeling and Packaging of chemical substances and mixtures, which implements the United Nations’ Globally Harmonized System into EU legislature.
- SDS Safety Data Sheet.
- ECHA European Chemicals Agency.
- UVCB substances Substances of Unknown or Variable composition, Complex reaction products or Biological materials.
- ČSN EN (ISO) European standard accepted into the Czech technical standard system.
- OSN or UN The United Nations.
- IBC The Intermediate Bulk Container.
- MARPOL 73/78 The International Convention for the Prevention of Pollution from Ships of 1978.
- DNEL Derived No Effect Level.
- DMEL Derived Minimal Effect Level.
- PNEC Predicted No Effect Concentration.
- WAF Water Accommodated Fiction.
- BCF Bioconcentration Factor.

## Sources of data used for preparing the safety sheet

- Records of Unipetrol RPA, s.r.o. on the classification of dangerous product characteristics  
Appendixes I, IV, VI and VII to EC Regulation No 1272/2008 CLP, as amended  
Principles for provision of first aid following exposure to chemical substances (doc. MUDr. Daniela Pelclová at al.)  
Registration documentation of the substance in accordance with EC Regulation No. 1907/2006, REACH  
Decision of ECHA No. SUB-D-2114147706-45-01/F on registration in accordance with EC Regulation No. 1907/2006, REACH  
Certificate No. 2003005/ÚPM - Institute of Fuels and Lubricants, Prague  
Protocol No. 5040 – Prague Fire Protection Technical Institute  
Test protocol No. 04366-RP VVUÚ, a.s. Ostrava-Radvanice





**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

Research data sources (Hazardous Substances Data Bank HSDB, Sicherheitstechnische Kenndaten chemischer Stoffe SORBE, MedisAlarm, University of Akron Chemical UAKRON, Portail Substances Chimiques INERIS, Gestis sanitary limits)

Full wording of the H-phrases and EUH-phrases listed in Sections 2 and/or 3

- H 315 Causes skin irritation.
- H 350 May cause cancer.
- H 411 Toxic to aquatic life with long lasting effects.

**Training guidelines**

Persons who handle the product must be demonstrably informed about its dangerous characteristics, the principles of protecting their health and the environment from its damaging effects and the principles of first aid (Act No. 258/2000, as amended).

**Access to information**

According to Article 35 of EC Regulation No. 1907/2006, REACH, all employers must allow access to information listed in the safety sheet to all workers who use this product or are exposed to its effects during their work, and also to representatives of such workers.

**Inspection and verification of the safety sheet**

Inspection and verification of this document with the requirements of EC Regulation No. 1907/2006, REACH, and EC Directive No. 1272/2008 CLP were performed by an independent specialist – Ing. Oldřich Petira, CSc., an authorized specialist in the area of chemistry and environmental protection with emphasis on industrial toxicology and chemical safety of the environment.

***Proclamation:*** Material This Material Safety Data Sheet has been elaborated in accordance with the Regulation (EC) No 1907/2006 REACH. It contains information necessary to ensure safety and protection of health at work and of the environment. This information does not substitute quality specification and should not be construed as any guarantee of suitability for particular applications. The data contained are based on the present state of knowledge and current national legislation. The user is responsible for ensuring the compliance with the relevant regional legislation.



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**ANNEX OF MATERIAL SAFETY DATA SHEET**

**EXPOSURE SCENARIOS ACCORDING TO ARTICLE 31 OF REGULATION (EC) NO 1907/2006 (REACH) OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**

The Annex contains exposure scenarios applied from Chapter 9 of the report on chemical safety presented at the registration of this substance for its designated use.

|   |             |
|---|-------------|
| Exposure scenario ES1:<br>Fuel oil production   | pages 18-21 |
| Exposure scenario ES2:<br>Fuel oil distribution   | pages 22-25 |
| Exposure scenario ES3:<br>Using fuel oil as an intermediate product for industrial production | pages 26-29 |
| Exposure scenario ES4:<br>Using fuel oil as an industrial fuel                                | pages 30-33 |



**MATERIAL SAFETY DATA SHEET**  
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**EXPOSURE SCENARIO 1: FUEL OIL PRODUCTION**

| SECTION 1                                   | NAME OF THE EXPOSURE SCENARIO   |
|---|---|
| <b>Name</b>                                 | Fuel oil production<br>CAS 64742-90-1   |
| <b>Use descriptor</b>                       | Usage areas:<br>Key descriptor SU 3, Industrial use<br>Supplementary descriptors: SU8, SU9<br>Process categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15<br>Environment release categories: ERC1, ERC4  |
| <b>Processes, tasks, related activities</b> | Production of the substance and its use as an intermediate product or as a procedural chemical extraction agent. Includes recycling/utilization, material transports, storing, sample collection, related laboratory work, maintenance and filling into transportation containers (including sea vessels/boats, road/rail cisterns and cistern containers). |

| SECTION 2   | OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES  |
|---|--|
| <i>Section 2.1</i>  | <i>Limiting workers' exposure</i>  |
| <b>Product characteristics</b>                                  |  |
| Physical form of the product                                    | Liquid, vapor pressure 0.5 -10 kPa [OC4].  |
| <b>Concentration of the substance in the product</b>            |  |
| <b>Amounts used</b>   | Not applicable.  |
| <b>Frequency and duration of use/exposure</b>                   | Continual process 24 hours/day, 330-360 days/year. Operators work during the usual working week (i.e. 40 hours/week), i.e. approx 220 days/year. Covers daily exposures up to 8 hours (unless stated differently) [G2].  |
| <b>Human factors not influenced by risk management</b>          | Impossible to determine.   |
| <b>Other operational conditions affecting workers' exposure</b> | Assumes use at not more than 20°C above ambient temperature [G15], unless stated otherwise.<br>Assumes a good basic standard of occupational hygiene is implemented [G1], unless stated otherwise.   |
| <b>Contributing scenarios:</b>                                  | <b>Risk management measures:</b>   |
| General measures (carcinogens) [G18].                           | Consider technical advances and process upgrades (including automation) for the elimination of leaks. Minimize exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain systems and clear transfer lines prior to removing / opening protection covers. Prior to maintenance work, clean / flush equipment, wherever possible.<br><br>At locations with a potential for exposure:<br>restrict access only to authorized persons,<br>provide specific activity training of operators to minimize exposures,<br>wear suitable gloves and protective clothing to prevent skin contamination,<br>wear respiratory protection whenever its use is prescribed for certain contributing scenarios,<br>clean spills immediately and dispose the leaked substance safely as |

|   |  |
|---|--|
|   | <p>waste.</p> <p>Secure a safe work system or equivalent arrangements to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].</p>   |
| General measures (substances causing skin irritation)   | Avoid direct skin contact with product. Identify places of possible indirect contact of skin with the product. Wear gloves (tested to EN374) if hand contamination likely. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop [E3].   |
| General exposure (closed systems) [CS15].   | Handle the substance within a closed system [E47].   |
| General exposure (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]. | Handle the substance within a closed system [E47].<br>Provide exhaust from points where emissions occur [E54].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| General exposure (closed systems) [CS15]. Use in contained batch processes [CS37].                                    | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide exhaust from points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27]. |
| General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].                         | Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| Process sampling [CS2].   | Sample via a closed loop or another system that prevents exposure [E8].<br>Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].              |
| Laboratory activities [CS36].   | Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].<br>Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure [E12].   |
| Bulk transfers [CS14]. (open systems) [CS108]. With potential for aerosol generation [CS138].                         | Ensure material transfers are under containment or extract ventilation [E66].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| Bulk transfers [CS14]. (closed systems) [CS107].  | Handle substance within a closed system [E47].<br>Ensure material transfers are under containment or extract ventilation [E66].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |



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|   |  |
|---|--|
| Equipment cleaning and maintenance [CS39].  | Drain down and flush system prior to equipment break-in or maintenance [E55].<br>Provide extract ventilation to points where emissions occur [E54].<br>Ensure operation is undertaken outdoors [E69].<br>Clear spills immediately [C&H13].<br>Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. |
| Storage [CS67]. With occasional controlled exposure [CS137].  | Sample via a closed loop or another system that prevents exposure [E8].<br>Store substance within a closed system [E84].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9 Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| <b>Section 2.2</b>  | <b>Limiting exposure of the environment</b>  |
| <b>Product characteristics</b>  | It is a complex UVCB substance [PrC3], mostly hydrophobic [PrC4a]. It is not easily biodegradable.   |
| <b>Used quantities</b>  |  |
| Fraction of the EU tonnage used in the region   | 0.2  |
| Regional use tonnage (tones/year)   | 2.0e5  |
| Fraction of the regional tonnage used locally   | 0.8  |
| Annual site tonnage (tones/year)  | 1.6e5  |
| Maximum daily site tonnage (kg/day)   | 5.3e5  |
| <b>Frequency and duration of use</b>  |  |
| Continuous release [FD2].   |  |
| Emission days (days/year)   | 300  |
| <b>Environmental factors not affected by risk management</b>  |  |
| Local freshwater dilution factor  | 40   |
| Local sea water dilution factor   | 100  |
| <b>Other operational conditions that effect environmental exposure</b>  |  |
| Released fraction to air from the process (initial release prior to RMM)  | 1.0e-3   |
| Released fraction to wastewater from the process (initial release prior to RMM)   | 3.0e-4   |
| Released fraction to soil from the process (initial release prior to RMM)   | 1.0e-4   |
| <b>Technical conditions and measures at the procedural level (at the source) for preventing release</b>   |  |
| Common practices vary across sites thus conservative process release estimates used [TCS1].   |  |
| <b>Technical local conditions and measures for reducing or limiting emissions and leaks into soil</b>   |  |
| Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). [TCR1k].<br>If discharging to domestic sewage treatment plant, no on-site wastewater treatment required. [TCR9].<br>Prevent discharge of undissolved substance to or recover from wastewater. [TCR14]. |  |
| Treat emissions in a way as to secure a typical removal efficiency of (%)   | 90   |
| Treat onsite wastewater (prior to discharging the incoming water) in a way as to provide the required removal efficiency of $\geq$ (%) [TCR8]. The treatment can be performed either on-site or through a local/municipal waste water treatment plant.  | 43.6   |
| <b>Organizational measures for preventing/limiting local releases</b>   |  |
| Do not apply industrial sludge to natural soils [OMS2].<br>Sludge should be incinerated, contained or reclaimed [OMS3].   |  |
| <b>Conditions and measures related to the local/municipal water treatment plant</b>   |  |
| Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]  | 94.9   |
| Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs [STP4]   | 94.9   |



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|   |        |
|---|--------|
| Maximum allowed site tonnage ( $M_{Safe}$ ) based on the given discharge from the local (communal or industrial) waste water treatment plant (kg/day) | 5.3e5  |
| Expected flow rate via the local (communal or industrial) waste water treatment plant (m <sup>3</sup> /day)   | 10,000 |
| <b>Conditions and measures related to external treatment of waste for disposal</b>  |        |
| During manufacturing no waste of the substance is generated. [ETW 4]  |        |
| <b>Conditions and measures related to external recycling/reuse of waste</b>   |        |
| During manufacturing no waste of the substance is generated. [EWR2]   |        |

|   |                           |
|---|---------------------------|
| <b>SECTION 3</b>  | <b>EXPOSURE ESTIMATES</b> |
| <i>Section 3.1</i>  | <i>Health</i>             |
| Exposure estimates were conducted using the ECETOC TRAv2 evaluation method. If complying with the recommended risk management measures under the listed operating conditions, it is not expected that exposure could exceed the specified DNEL/DMEL values. |                           |
| <i>Section 3.2</i>  | <i>The environment</i>    |
| Exposure estimates were conducted using the statistical block HC5 extrapolation method, utilizing the PETROTOX v. 3.05 model.   |                           |

|  |  |
|--|--|
| <b>SECTION 4</b>   | <b>INSTRUCTIONS FOR INSPECTING COMPLIANCE WITH THE EXPOSURE SCENARIO</b> |
| <i>Section 4.1</i>   | <i>Health</i>  |
| The expected exposure should not exceed the specified DNEL/DMEL values as long as the risk management measures/operating conditions listed in Section 2 are complied with.<br>The processes related to production do not represent an unacceptable risk for the health of employees in the industry, provided exposures are controlled by utilizing suitable operating conditions (e.g. duration of tasks, use of ventilation) and precautions for risk management (e.g. personal protective measures) are of a such nature that they ensure that the exposures do not exceed the specified DNEL/DMEL values. Where risk management measures/operating conditions have been amended, users must make sure that risks are controlled at least at equivalent levels. |  |
| <i>Section 4.2</i>   | <i>The environment</i>   |
| 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].<br>Required removal efficiency for wastewater can be achieved using onsite/external technologies, either alone or in a combination [DSU2].<br>Required removal efficiency for air can be achieved using onsite technologies, either alone or in a combination [DSU3].   |  |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

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**EXPOSURE SCENARIO 2: FUEL OIL DISTRIBUTION**

| SECTION 1                                   | NAME OF THE EXPOSURE SCENARIO   |
|---|---|
| <b>Name</b>                                 | Fuel oil distribution<br>CAS 64742-90-1   |
| <b>Use descriptor</b>                       | Areas of use:<br>Key descriptor SU 3, Industrial use<br>Supplementary descriptors: SU8, SU9<br>Process categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15<br>Environment release categories: ERC1-7                    |
| <b>Processes, tasks, related activities</b> | Filling transport devices (including marine boats, road/railway tank cars and tank containers), repackaging of the substance (including barrels as well as small packages), including its distribution and related laboratory activities. |

| SECTION 2   | OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES   |
|---|---|
| <i>Section 2.1</i>  | <i>Limiting workers' exposure</i>   |
| <b>Product characteristics</b>                                  |   |
| Physical form of the product                                    | Liquid, vapor pressure 0.5 -10 kPa [OC4].   |
| <b>Concentration of the substance in the product</b>            | <b>Covers percentage substance in the product up to 100 % (unless stated differently) [G13].</b>  |
| <b>Amounts used</b>   | Not applicable.   |
| <b>Frequency and duration of use/exposure</b>                   | Covers daily exposures up to 8 hours (unless stated differently) [G2].  |
| <b>Human factors not influenced by risk management</b>          | Impossible to determine.  |
| <b>Other operational conditions affecting workers' exposure</b> |   |
| <b>Contributing scenarios:</b>                                  | <b>Risk management measures:</b>  |
| General measures (carcinogens) [G18].                           | Consider technical advances and process upgrades (including automation) for the elimination of leaks. Minimize exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain systems and clear transfer lines prior to removing / opening protection covers. Prior to maintenance work, clean / flush equipment, wherever possible.<br>At locations with a potential for exposure:<br>restrict access only to authorized persons,<br>provide specific activity training of operators to minimize exposures,<br>wear suitable gloves and protective clothing to prevent skin contamination,<br>wear respiratory protection whenever its use is prescribed for certain contributing scenarios,<br>clean spills immediately and dispose the leaked substance safely as waste.<br>Secure a safe work system or equivalent arrangements to manage risks. Regularly inspect, test and maintain all control measures.<br>Include measures for protecting health arising from the given medical supervision / medical exams [G20].<br>Avoid direct skin contact with product. Identify potential areas for |





**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
 modification: 01/11/2016 – 8(4)  
 Replaces: 12/1/2010 – 7<sup>th</sup> issue

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|   | indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop [E3].   |
| General measures (substances causing skin irritation)   | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. [E3]. |
| General exposure (closed systems) [CS15].   | Handle substance within a closed system [E47].   |
| General exposure (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]. | Handle substance within a closed system [E47].<br>Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].  |
| General exposure (closed systems) [CS15]. Use in contained batch processes [CS37].                                    | Handle substance within a closed system [E47].<br>Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9] Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].                              |
| General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].                         | Ensure material transfers are under containment or extract ventilation [E66].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| Process sampling [CS2].   | Handle substance within a closed system [E47].<br>Sample via a closed loop or another system that prevents exposure [E8].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].                        |
| Laboratory activities [CS36].   | Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure [E12].   |
| Bulk transfers [CS14]. (closed systems) [CS107].  | Ensure material transfers are under containment or extract ventilation [E66].<br>Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| Bulk transfers [CS14]. (open systems) [CS108].  | Ensure material transfers are under containment or extract ventilation [E66].<br>Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| Drum and small package filling [CS6].   | Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].<br>Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].  |
| Equipment cleaning and maintenance  | Drain down and flush system prior to equipment break-in or maintenance   |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

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|--|---|
| [CS39].  | [E55].<br>Clear spills immediately [C&H13].<br>Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. |
| Storage [CS67]. With occasional controlled exposure [CS137].   | Sample via a closed loop or another system that prevents exposure [E8].<br>Ensure operation is undertaken outdoors [E69].<br>Store substance within a closed system [E84].  |
| <b>Section 2.2</b>   | <b>Limiting exposure of the environment</b>   |
| <b>Product characteristics</b>   | It is a complex UVCB substance [PrC3], mostly hydrophobic [PrC4a]. It is not easily biodegradable.  |
| <b>Used quantities</b>   |   |
| Fraction of the EU tonnage used in the region  | 0.1   |
| Regional use tonnage (tones/year)  | 1.0e5   |
| Fraction of the regional tonnage used locally  | 0.002   |
| Annual site tonnage (tones/year)   | 2.0e2   |
| Maximum daily site tonnage (kg/day)  | 1e4   |
| <b>Frequency and duration of use</b>   |   |
| Continuous release [FD2].  |   |
| Emission days (days/year)  | 20  |
| <b>Environmental factors not affected by risk management</b>   |   |
| Local freshwater dilution factor   | 10  |
| Local sea water dilution factor  | 100   |
| <b>Other operational conditions that effect environmental exposure</b>   |   |
| Released fraction to air from the process (initial release prior to RMM)   | 1.0e-4  |
| Released fraction to wastewater from the process (initial release prior to RMM)  | 1.0e-5  |
| Released fraction to soil from the process (initial release prior to RMM)  | 1.0e-5  |
| <b>Technical conditions and measures at the procedural level (at the source) for preventing release</b>  |   |
| Common practices vary across sites thus conservative process release estimates used [TCS1].  |   |
| <b>Technical local conditions and measures for reducing or limiting emissions and leaks into soil</b>  |   |
| Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1j].<br>No wastewater treatment required [TCR6].<br>Prevent discharge of undissolved substance to or recover from wastewater [TCR14].    |   |
| Treat emissions in a way as to secure a typical removal efficiency of (%)  | 90  |
| Treat onsite wastewater (prior to discharging the incoming water) in a way as to provide the required removal efficiency of $\geq$ (%). The treatment can be performed either on-site or through a local/communal waste water treatment plant. | 0   |
| <b>Organizational measures for preventing/limiting local releases</b>  |   |
| Do not apply industrial sludge to natural soils [OMS2].<br>Sludge should be incinerated, contained or reclaimed [OMS3].  |   |
| <b>Conditions and measures related to the local/municipal water treatment plant</b>  |   |
| Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]   | 94.9  |
| Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%) [STP4]  | 94.9  |
| Maximum allowed site tonnage (MSafe) based on the given discharge from the local (communal or industrial) waste water treatment plant (kg/day)   | 2.6e5   |
| Expected flow rate via the local (communal or industrial) waste water treatment plant (m <sup>3</sup> /day)  | 2,000   |
| <b>Conditions and measures related to external treatment of waste for disposal</b>   |   |
| During manufacturing no waste of the substance is generated [ETW 4]  |   |
| <b>Conditions and measures related to external recycling/reuse of waste</b>  |   |



**MATERIAL SAFETY DATA SHEET  
PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
 modification: 01/11/2016 – 8(4)  
 Replaces: 12/1/2010 – 7<sup>th</sup> issue

During manufacturing no waste of the substance is generated. [EWR2]

|   |                           |
|---|---------------------------|
| <b>SECTION 3</b>  | <b>EXPOSURE ESTIMATES</b> |
| <i>Section 3.1</i>  | <i>Health</i>             |
| Exposure estimates were conducted using the ECETOC TRA evaluation method. If complying with the recommended risk management measures under the listed operating conditions, it is not expected that exposure could exceed the specified DNEL/DMEL values. |                           |
| <i>Section 3.2</i>  | <i>The environment</i>    |
| Exposure estimates were conducted using the statistical block HC5 extrapolation method, utilizing the PETROTOX v. 3.05 model.   |                           |

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| <b>SECTION 4</b>   | <b>INSTRUCTIONS FOR INSPECTING COMPLIANCE WITH THE EXPOSURE SCENARIO</b> |
| <i>Section 4.1</i>   | <i>Health</i>  |
| <p>The expected exposure should not exceed the specified DNEL/DMEL values as long as the risk management measures/operating conditions listed in Section 2 are complied with.</p> <p>The processes related to distribution do not represent an unacceptable risk for the health of employees in the industry, provided exposures are controlled by utilizing suitable operating conditions (e.g. duration of tasks, use of ventilation) and precautions for risk management (e.g. personal protective measures) are of a such nature that they ensure that the exposures do not exceed the specified DNEL/DMEL values.</p> <p>Where risk management measures/operating conditions have been amended, users must make sure that risks are controlled at least at equivalent levels.</p> |  |
| <i>Section 4.2</i>   | <i>The environment</i>   |
| <p>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].</p> <p>Required removal efficiency for wastewater can be achieved using onsite/external technologies, either alone or in a combination [DSU2].</p> <p>Required removal efficiency for air can be achieved using onsite technologies, either alone or in a combination [DSU3].</p>  |  |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

**EXPOSURE SCENARIO 3: USING FUEL OIL AS AN INTERMEDIATE PRODUCT FOR INDUSTRIAL PRODUCTION**

The use of fuel oil as an intermediate product for industrial production is covered by exposure scenario ES1: Fuel oil production

| SECTION 1                                   | NAME OF THE EXPOSURE SCENARIO  |
|---|--|
| <b>Name</b>                                 | Using fuel oil as an intermediate product for industrial production<br>CAS 64742-90-1  |
| <b>Use descriptor</b>                       | Areas of use:<br>Key descriptor SU 3, Industrial use<br>Supplementary descriptors: SU8, SU9<br>Process categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15<br>Environment release categories: ERC6a |
| <b>Processes, tasks, related activities</b> | Used as an isolated intermediate product under conditions that are not strictly controlled.  |

| SECTION 2   | OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES  |
|---|--|
| <i>Section 2.1</i>  | <i>Limiting workers' exposure – see Section 2.1 for ES1: Fuel oil production</i>   |
| <b>Product characteristics</b>                                  |  |
| Physical form of the product                                    | Liquid, vapor pressure of 0.5 -10 kPa [OC4].   |
| <b>Concentration of the substance in the product</b>            |  |
| <b>Amounts used</b>   | Not applicable.  |
| <b>Frequency and duration of use/exposure</b>                   | Continual process 24 hours/day, 330-360 days/year. Operators work during the usual working week (i.e. 40 hours/week), i.e. approx 220 days/year. Applies to daily exposures of up to 8 hours Covers daily exposures up to 8 hours (unless stated differently) [G2].  |
| <b>Human factors not influenced by risk management</b>          | Impossible to determine.   |
| <b>Other operational conditions affecting workers' exposure</b> | Assumes use at not more than 20°C above ambient temperature [G15], unless stated otherwise.<br>Assumes a good basic standard of occupational hygiene is implemented [G1], unless stated otherwise.   |
| <b>Contributing scenarios:</b>                                  | <b>Risk management measures :</b>  |
| General measures (carcinogens) [G18].                           | Consider technical advances and process upgrades (including automation) for the elimination of leaks. Minimize exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain systems and clear transfer lines prior to removing / opening protection covers. Prior to maintenance work, clean / flush equipment, wherever possible.<br>At locations with a potential for exposure:<br>restrict access only to authorized persons,<br>provide specific activity training of operators to minimize exposures,<br>wear suitable gloves and protective clothing to prevent skin contamination,<br>wear respiratory protection whenever its use is prescribed for certain contributing scenarios,<br>clean spills immediately and dispose the leaked substance safely as |

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|   | <p>waste.</p> <p>Secure a safe work system or equivalent arrangements to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].</p> <p>Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop [E3].</p> |
| General measures (substances causing skin irritation)   | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop [E3].   |
| General exposure (closed systems) [CS15].   | Handle substance within a closed system [E47].  |
| General exposure (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]. | Handle substance within a closed system [E47].<br>Provide extract ventilation to points where emissions occur [E54].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| General exposure (closed systems) [CS15]. Use in contained batch processes [CS37].                                    | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].  |
| General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].                         | Provide extract ventilation to points where emissions occur [E54].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| Process sampling [CS2].   | Sample via a closed loop or another system that prevents exposure [E8].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].   |
| Laboratory activities [CS36].   | Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].<br>Handle within a fume cupboard or implement suitable equivalent methods to minimize exposure [E12].  |
| Bulk transfers [CS14]. (open systems) [CS108]. With potential for aerosol generation [CS138].                         | Ensure material transfers are under containment or extract ventilation [E66].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| Bulk transfers [CS14]. (closed systems) [CS107].  | Handle substance within a closed system [E47].<br>Ensure material transfers are under containment or extract ventilation [E66].   |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

|   |  |
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|   | Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| Device cleaning and maintenance [CS39].   | Drain down and flush system prior to equipment break-in or maintenance [E55].<br>Provide extract ventilation to points where emissions occur [E54].<br>Ensure operation is undertaken outdoors [E69].<br>Clear spills immediately [C&H13].<br>Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. |
| Storage [CS67]. With occasional controlled exposure [CS137].  | Sample via a closed loop or another system that prevents exposure [E8].<br>Store substance within a closed system [E84].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].  |
| <b>Section 2.2</b>  | <b>Limiting exposure of the environment</b>  |
| <b>Product characteristics</b>  | It is a complex UVCB substance [PrC3], mostly hydrophobic [PrC4a]. It is not easily biodegradable.   |
| <b>Used quantities</b>  |  |
| Fraction of the EU tonnage used in the region   | 0.1  |
| Regional use tonnage (tones/year)   | 2.0e4  |
| Fraction of the regional tonnage used locally   | 0.75   |
| Annual site tonnage (tones/year)  | 1.5e4  |
| Maximum daily site tonnage (kg/day)   | 5e4  |
| <b>Frequency and duration of use</b>  |  |
| Continuous release [FD2].   |  |
| Emission days (days/year)   | 300  |
| <b>Environmental factors not affected by risk management</b>  |  |
| Local freshwater dilution factor  | 10   |
| Local sea water dilution factor   | 100  |
| <b>Other operational conditions that effect environmental exposure</b>  |  |
| Released fraction to air from the process (initial release prior to RMM)  | 2.0e-4   |
| Released fraction to wastewater from the process (initial release prior to RMM)   | 3.0e-4   |
| Released fraction to soil from the process (initial release prior to RMM)   | 1.0e-3   |
| <b>Technical conditions and measures at the procedural level (at the source) for preventing release</b>   |  |
| Common practices vary across sites thus conservative process release estimates used [TCS1].   |  |
| <b>Technical local conditions and measures for reducing or limiting emissions and leaks into soil</b>   |  |
| Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). [TCR1j].<br>If discharging to domestic sewage treatment plant, no on-site wastewater treatment required [TCR9].<br>Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. |  |
| Treat emissions in a way as to secure a typical removal efficiency of (%)   | 80   |
| Treat onsite wastewater (prior to discharging the incoming water) in a way as to provide the required removal efficiency of $\geq$ (%). The treatment can be performed either on-site or through a local/municipal waste water treatment plant.   | 99.7   |
| <b>Organizational measures for preventing/limiting local releases</b>   |  |
| Do not apply industrial sludge to natural soils [OMS2].<br>Sludge should be incinerated, contained or reclaimed [OMS3].   |  |
| <b>Conditions and measures related to the local/municipal water treatment plant</b>   |  |
| Estimated substance removal from wastewater via a local (communal or industrial) waste water treatment plant (%)  | 94.9   |





**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
modification: 01/11/2016 – 8(4)  
Replaces: 12/1/2010 – 7<sup>th</sup> issue

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| Overall efficiency of removal from wastewater after applying RMM at as well as outside of the given local (communal or industrial) waste water treatment plant (%) | 99.7  |
| Maximum allowed site tonnage (MSafe) based on the given discharge from the local (communal or industrial) waste water treatment plant (kg/day)                     | 5.0e4 |
| Expected flow rate via the local (communal or industrial) waste water treatment plant (m <sup>3</sup> /day)  | 2,000 |
| <b>Conditions and measures related to external treatment of waste for disposal</b>   |       |
| This substance is consumed during use and no waste of the substance is generated [ETW5]  |       |
| <b>Conditions and measures related to external recycling/reuse of waste</b>  |       |
| This substance is consumed during use and no waste of the substance is generated [EWR3]  |       |

|   |                           |
|---|---------------------------|
| <b>SECTION 3</b>  | <b>EXPOSURE ESTIMATES</b> |
| <i>Section 3.1</i>  | <i>Health</i>             |
| Exposure estimates were conducted using the ECETOC TRA evaluation method. If complying with the recommended risk management measures under the listed operating conditions, it is not expected that exposure could exceed the specified DNEL/DMEL values. |                           |
| <i>Section 3.2</i>  | <i>The environment</i>    |
| Exposure estimates were conducted using the statistical block HC5 extrapolation method, utilizing the PETROTOX v. 3.05 model.   |                           |

|  |  |
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| <b>SECTION 4</b>   | <b>INSTRUCTIONS FOR INSPECTING COMPLIANCE WITH THE EXPOSURE SCENARIO</b> |
| <i>Section 4.1</i>   | <i>Health</i>  |
| <p>The expected exposure should not exceed the specified DNEL/DMEL values as long as the risk management measures/operating conditions listed in Section 2 are complied with.</p> <p>The processes related to the use as an intermediate product do not represent an unacceptable risk for the health of employees in the industry, provided exposures are controlled by utilizing suitable operating conditions (e.g. duration of tasks, use of ventilation) and precautions for risk management (e.g. personal protective measures) are of a such nature that they ensure that the exposures do not exceed the specified DNEL/DMEL values.</p> <p>Where risk management measures/operating conditions have been amended, users must make sure that risks are controlled at least at equivalent levels.</p> |  |
| <i>Section 4.2</i>   | <i>The environment</i>   |
| <p>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].</p> <p>Required removal efficiency for wastewater can be achieved using onsite/external technologies, either alone or in a combination [DSU2].</p> <p>Required removal efficiency for air can be achieved using onsite technologies, either alone or in a combination [DSU3].</p>  |  |





**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
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**EXPOSURE SCENARIO 4: USING FUEL OIL AS AN INDUSTRIAL FUEL**

| SECTION 1                                   | NAME OF THE EXPOSURE SCENARIO  |
|---|--|
| <b>Name</b>                                 | Using fuel oil as an industrial fuel<br>CAS 64742-90-1   |
| <b>Use descriptor</b>                       | Areas of use:<br>Key descriptor SU 3, Industrial use<br>Supplementary descriptors: SU10<br>Process categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16<br>Environment release categories: ERC8b |
| <b>Processes, tasks, related activities</b> | Covers its use as a fuel (or fuel additive) and includes activities related to its transfer, usage and maintenance of related devices and waste management.  |

| SECTION 2   | OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES   |
|---|---|
| <i>Section 2.1</i>  | <i>Limiting workers' exposure</i>   |
| <b>Product characteristics</b>                                  |   |
| Physical form of the product                                    | Liquid, vapor pressure 0.5 -10 kPa [OC4].   |
| <b>Concentration of the substance in the product</b>            | Covers daily exposures up to 8 hours (unless stated differently) [G2].  |
| <b>Amounts used</b>   | Not applicable.   |
| <b>Frequency and duration of use/exposure</b>                   | Covers daily exposures up to 8 hours (unless stated differently) [G2].  |
| <b>Human factors not influenced by risk management</b>          | Impossible to determine.  |
| <b>Other operational conditions affecting workers' exposure</b> | Assumes use at not more than 20°C above ambient temperature [G15], unless stated otherwise.<br>Assumes a good basic standard of occupational hygiene is implemented [G1], unless stated otherwise.  |
| <b>Contributing scenarios:</b>                                  | <b>Risk management measures:</b>  |
| General measures (carcinogens) [G18].                           | Consider technical advances and process upgrades (including automation) for the elimination of leaks. Minimize exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain systems and clear transfer lines prior to removing / opening protection covers. Prior to maintenance work, clean / flush equipment, wherever possible.<br>At locations with a potential for exposure:<br>restrict access only to authorized persons,<br>provide specific activity training of operators to minimize exposures,<br>wear suitable gloves and protective clothing to prevent skin contamination,<br>wear respiratory protection whenever its use is prescribed for certain contributing scenarios,<br>clean spills immediately and dispose the leaked substance safely as waste.<br>Secure a safe work system or equivalent arrangements to manage risks. Regularly inspect, test and maintain all control measures.<br>Consider the need for risk based health surveillance. [G20]. |
| General measures (substances)                                   | Avoid direct skin contact with product. Identify potential areas for  |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

Issue date: 7/16/2004

Revision: 8/1/2011 – 8<sup>th</sup> issue  
 modification: 01/11/2016 – 8(4)  
 Replaces: 12/1/2010 – 7<sup>th</sup> issue

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| causing skin irritation)  | indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. [E3].   |
| General measures (substances causing skin irritation)                                     | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination / spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. [E3].  |
| Bulk transfers [CS14].  | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure longer than 4 hours [OC28].   |
| Drum/batch transfers [CS8]  | Use drum pumps [E53].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].  |
| General exposures (enclosed systems) [CS15].  | Handle substance within a closed system [E47]   |
| General exposures (enclosed systems) [CS15]. With occasional controlled exposure [CS137]. | Handle substance within a closed system [E47]<br>Sample via a closed loop or another system that prevents exposure [E8].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].   |
| General exposures (enclosed systems) [CS15]. Batch process [CS55].                        | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].  |
| General exposures (open systems) [CS16]. (closed systems) [CS107].                        | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide extract ventilation to points where emissions occur [E54].  |
| General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].  | Handle substance within a predominantly closed system provided with extract ventilation [E49].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].  |
| Equipment maintenance [CS5].  | Drain down system prior to equipment break-in or maintenance [E65].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], or [G9]: Ensure operation is undertaken outdoors [E69].<br>Clear spills immediately [C&H13].<br>Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].<br>Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. |
| Vessel and container cleaning [CS103].  | Drain down and flush system prior to equipment break-in or maintenance [E55].<br>Provide extract ventilation to points where emissions occur [E54].<br>Clear spills immediately [C&H13].<br>Retain drain downs in sealed storage pending disposal or for subsequent   |



**MATERIAL SAFETY DATA SHEET**  
**PYROLYSIS FUEL OIL**

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Replaces: 12/1/2010 – 7<sup>th</sup> issue

|  |   |
|--|---|
|  | recycle [ENVT4].  |
| Storage [CS67].  | Store substance within a closed system [E84].   |
| Storage [CS67]. With occasional controlled exposure [CS137].   | Sample via a closed loop or another system that prevents exposure [E8].<br>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].<br>Store substance within a closed system [E84]. |
| Disposal of wastes [CS28]  | Sample via a closed loop or another system that prevents exposure [E8].<br>Avoid carrying out activities involving exposure for more than 1 hour [OC27].  |
| <b>Section 2.2</b>   | <b>Limiting exposure of the environment</b>   |
| <b>Product characteristics</b>   | It is a complex UVCB substance [PrC3], mostly hydrophobic [PrC4a]. It is not easily biodegradable.  |
| <b>Used quantities</b>   |   |
| Fraction of the EU tonnage used in the region  | 0.2   |
| Regional use tonnage (tones/year)  | 1.1e5   |
| Fraction of the regional tonnage used locally  | 1.4   |
| Annual site tonnage (tones/year)   | 1.6e5   |
| Maximum daily site tonnage (kg/day)  | 5.3e5   |
| <b>Frequency and duration of use</b>   |   |
| Continuous release [FD2].  |   |
| Emission days (days/year)  | 300   |
| <b>Environmental factors not affected by risk management</b>   |   |
| Local freshwater dilution factor   | 10  |
| Local sea water dilution factor  | 100   |
| <b>Other operational conditions that effect environmental exposure</b>   |   |
| Released fraction to air from the process (initial release prior to RMM)   | 2.5e-4  |
| Released fraction to wastewater from the process (initial release prior to RMM)  | 1.0e-5  |
| Released fraction to soil from the process (initial release prior to RMM)  | 0   |
| <b>Technical conditions and measures at the procedural level (at the source) for preventing release</b>  |   |
| Common practices vary across sites thus conservative process release estimates used [TCS1].  |   |
| <b>Technical local conditions and measures for reducing or limiting emissions and leaks into soil</b>  |   |
| Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation). [TCR1k].<br>No wastewater treatment required [TCR6].<br>Prevent discharge of undissolved substance to or recover from wastewater [TCR14].   |   |
| Treat emissions in a way as to secure a typical removal efficiency of (%)  | 95  |
| Treat onsite wastewater (prior to discharging the incoming water) in a way as to provide the required removal efficiency of $\geq$ (%). The treatment can be performed either on-site or through a local/communal waste water treatment plant. | 0   |
| <b>Organizational measures for preventing/limiting local releases</b>  |   |
| Do not apply industrial sludge to natural soils [OMS2].<br>Sludge should be incinerated, contained or reclaimed [OMS3].  |   |
| <b>Conditions and measures related to the local/municipal water treatment plant</b>  |   |
| Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]   | 94.9  |
| Overall efficiency of removal from wastewater after applying RMM at as well as outside of the given local (communal or industrial) waste water treatment plant (%) [STP47]   | 94.9  |
| Maximum allowed site tonnage (MSafe) based on the given discharge from the local (communal or industrial) waste water treatment plant (kg/day)   | 1.9e5   |
| Expected flow rate via the local (communal or industrial) waste water treatment plant (m3/day)   | 2,000   |
| <b>Conditions and measures related to external treatment of waste for disposal</b>   |   |
| This substance is consumed during use and no waste of the substance is generated [ETW5]  |   |



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**Conditions and measures related to external recycling/reuse of waste**

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

| <b>SECTION 3</b>  | <b>EXPOSURE ESTIMATES</b> |
|---|---------------------------|
| <i>Section 3.1</i>  | <i>Health</i>             |
| Exposure estimates were conducted using the ECETOC TRA evaluation method. If complying with the recommended risk management measures under the listed operating conditions, it is not expected that exposure could exceed the specified DNEL/DMEL values. |                           |
| <i>Section 3.2</i>  | <i>The environment</i>    |
| Exposure estimates were conducted using the statistical block HC5 extrapolation method, utilizing the PETROTOX v. 3.05 model.   |                           |

| <b>SECTION 4</b>   | <b>INSTRUCTIONS FOR INSPECTING COMPLIANCE WITH THE EXPOSURE SCENARIO</b> |
|--|--|
| <i>Section 4.1</i>   | <i>Health</i>  |
| The expected exposure should not exceed the specified DNEL/DMEL values as long as the risk management measures/operating conditions listed in Section 2 are complied with.<br>The processes related industrial burning of the fuel oil do not represent an unacceptable risk for the health of employees in the industry, provided exposures are controlled by utilizing suitable operating conditions (e.g. duration of tasks, use of ventilation) and precautions for risk management (e.g. personal protective measures) are of a such nature that they ensure that the exposures do not exceed the specified DNEL/DMEL values.<br>Where risk management measures/operating conditions have been amended, users must make sure that risks are controlled at least at equivalent levels. |  |
| <i>Section 4.2</i>   | <i>The environment</i>   |
| 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].<br>Required removal efficiency for wastewater can be achieved using onsite/external technologies, either alone or in a combination [DSU2].<br>Required removal efficiency for air can be achieved using onsite technologies, either alone or in a combination [DSU3].   |  |