

SIBUR-KSTOVO LLC

SAFETY DATA SHEET

According to 1907/2006/EC (REACH), 1272/2008 (CLP) & 453/2010

HEAVY PYROLYSIS RESIN

VERSION: 1.0
DATE CREATED: 15/08/2012
Regulation: EC No 1272/2008

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1 Product identifier

NAME OF SUBSTANCE:	Residues (petroleum), steam-cracked
IUPAC Name	Not applicable to a UVCB stream
TRADE NAMES:	Heavy pyrolysis resin, Heavy resin of pyrolysis
SYNONYMS:	Heavy pyrolysis tar
Index No (CLP):	649-018-00-6
CAS #:	64742-90-1
EC #:	265-193-8
REGISTRATION #:	01-2119485585-24-0025

1.2 Relevant identified uses of the substance

Most common technical function of substance:

- Intermediates
- Fuels and fuel additives

For the detailed identified uses of the product see Annex 1.

The use of the substance should be limited to those specified in Annex 1.

1.3 Details of the safety data sheet supplier

SUPPLIER:

Company name: SIBUR-KSTOVO LLC
Address: Industrial Area, Kstovo District, Nizhny Novgorod region, 607650,
Russian Federation
Contact Telephone: +7 83145 9 49 10
Fax: +7 83145 9 49 10
Email Address: infonhz@sibur-nn.ru
Emergency Telephone: +7 83145 9 49 10 (round the clock)

Emergency phone in the country of delivery: 112 (*Please note that emergency numbers may vary depending upon the country of delivery though 112 remains valid as universal number*)

ONLY REPRESENTATIVE:

Company name: Gazprom Marketing and Trading France
Address: 68 avenue des Champs-Élysées, Paris, 75008, France
Contact phone: +33 1 42 99 73 50
Fax: +33 1 42 99 73 99
Email address: yury.severinchik@gazprom-mt.com

SECTION 2. HAZARDS IDENTIFICATION

Residues (petroleum), steam-cracked (UVCB substance).

2.1 CLASSIFICATION

Classification and labelling according to DSD / DPD

Classification and labelling in Annex I of Directive 67/548/EEC

Residues (petroleum), steam-cracked (UVCB substance).

Classification for category: Heavy distillates steam-cracked naphtha containing heavy aromatic hydrocarbons, 3-7 ring PAH, naphthalene < 25%
Flashpoint > 55°C and viscosity > 7 mm²/s at 40°C.

Physical/Chemical Hazards:

Not classified

Health Hazards:

Xi; R38 Irritant. Irritating to skin.
Carc. Cat. 2; R45 May cause cancer
Muta. Cat. 2; R46 May cause heritable genetic damage

Environmental hazards:

N; R51/53 Dangerous for the environment; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Classification and labelling according to EC/1272/2008 Annex VI (CLP):

Classification for category: Heavy distillates steam-cracked naphtha containing heavy aromatic hydrocarbons, 3-7 ring PAH, naphthalene < 25%.
Flashpoint > 60°C and viscosity > 20.5 mm²/s at 40°C.

Physical/Chemical Hazards:

Not classified

Health Hazards:

Skin: Skin Irritation 2; H315: Causes skin irritation
Germ cell mutagenicity: Muta. 1B; H340: May cause genetic defects
Carcinogenicity: Carc. 1B; H350: May cause cancer

Environmental hazards:

Aquatic Chronic 2; H411: Toxic to aquatic life with long lasting effects

2.2 LABELLING

EU LABELLING:

Indication of danger: Irritant



T (Toxic)



N (dangerous for the environment)

CLP LABELLING:

Signal word: Danger

Hazard pictogram:



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment

Other hazards:

Safety Hazards

May ignite on surfaces at temperatures above auto-ignition temperature. Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding autoignition temperature, where vapour concentrations are within the flammability range. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

Assessment PBT / vPvB:

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH):

- not fulfilling PBT (persistent/bioaccumulative/toxic) criteria;
- not fulfilling vPvB (very persistent/very bioaccumulative) criteria.

The full text for all S, P-Phrases is given in Section 16.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

According to 1907/2006/EC (REACH) the product is UVCB

Category: Heavy distillates steam-cracked naphtha containing heavy aromatic hydrocarbons, 3-7 ring PAH, naphthalene < 25%.

Flashpoint > 60°C and viscosity ≤ 20.5 mm²/s at 40°C:

Name EC No	EC No	CAS No	Content (w/w) %	Classification Regulation (EC) No 67/548 and (EC) No 1272/2008 (CLP)
Residues (petroleum), steam-cracked <i>Index No(CLP):</i> 649-018-00-6	265-193-8	64742-90-1	100	Xi: R38; CMR2&2:R45/46; N:R51/53 H315; H340; H350; H411
Including substances affecting general product classification and labelling:				
naphthalene <i>Index No(CLP):</i> 601-052-00-2	202-049-5	91-20-3	≤20.0	Xn: R22; Carc. Cat. 3: R40; N: R50/53 H351; H302; H400; H410
biphenyl <i>Index No(CLP):</i> 601-042-00-8	202-163-5	92-52-4	≤10.0	Xi: R36/37/38; N: R50-53 H319; H335; H315; H400; H410
toluene <i>Index No(CLP):</i> 601-021-00-3	203-625-9	108-88-3	≤1.0	F: R11; Repr. Cat. 3: R63; Xn: R48/20-65; Xi: R38; R67 H225; H361d; H304; H373; H315; H336
styrene <i>Index No(CLP):</i> 601-026-00-0	202-851-5	100-42-5	≤5.0	R10; Xn: R20; Xi: R36/38 H226; H332; H319; H315
Dicyclopentadiene <i>Index No(CLP):</i> 601-044-00-9	201-052-9	77-73-6	≤1.5	F: R11; Xn: R20/22; Xi: R36/37/38; N: R51-53 H225; H332; H302; H319; H335; H315; H411
anthracene	204-371-1	120-12-7	≤0.1	Xi: 38; N: R50/53 H315; H400; H410
1-methylnaphthalene	215-329-7	1321-94-4	≤5.0	No date
2-methylnaphthalene	202-078-3	91-57-6	≤5.0	-
indene	202-393-6	95-13-6	≤2.5	No date
phenanthrene	201-581-5	85-01-8	≤2.5	No date

Specific Conc. Limits (CLP): none.

M-factor: none.

SECTION 4. FIRST-AID MEASURES

General Advice:

Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures.
Take care to self-protect by avoiding becoming contaminated.
Use adequate respiratory protection.
Move contaminated patient(s) out of the dangerous area.
Take off all contaminated clothing and shoes.
Seek medical assistance - show the material safety data sheet or label if possible.

If inhaled:

Move to fresh air.
Do not leave the victim unattended.
Keep patient warm and at rest.
Seek immediate medical attention.
If breathing is difficult, give oxygen if possible or assisted ventilation, (do not use mouth to mouth).
If unconscious place in recovery position.
In the event of cardiac arrest, (no pulse), apply cardiopulmonary resuscitation.

Skin contact:

Take off all contaminated clothing and shoes.
Immediately flush affected area with plenty of soap and water – continue for at least 15 minutes.
If there are signs of irritation or other symptoms seek medical attention.

Contact with eyes:

Remove any contact lenses.
Flush eyes with water thoroughly and continuously for at least 15 minutes.
Keep eye wide open while rinsing.
Protect unharmed eye.
If there are signs of irritation or other symptoms seek medical attention.
If eye irritation, pain, swelling, lachrimation or photophobia persists, the patient should be seen in a specialist health care facility.

Ingestion:

Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
(Subject applicability) Liquid of low viscosity: Do NOT induce vomiting, if vomiting does occur, have victim lean forward to reduce risk of aspiration. Get medical attention immediately.

Note to physician:

Causes irritation to the skin:
This irritation can result in redness and swelling of the skin. Repeated contact with the skin may cause it to become dry and cracked.
May cause eye irritation:

This irritation can result in redness and swelling of the eyes.

May cause respiratory irritation:

If inhalation occurs, signs and symptoms may include sore throat, headache, nausea, coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and may cause transient central nervous system (CNS) depression.

In case of ingestion:

Ipecac-induced emesis is not recommended.

Consider use of charcoal as a slurry (240 mL water/30 g charcoal). Usual dose: 25 to 100 g in adults.

If a potentially fatal dose has been ingested the stomach should be emptied by gastric lavage under qualified medical supervision with the airway protected by endotracheal intubation.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing media:

LARGE FIRE: Use water spray, water fog or foam.

SMALL FIRE: Dry powder or carbon dioxide (CO₂) extinguisher, dry sand or fire fighting foam.

Unsuitable Extinguishing Media:

Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire.

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

Combustion Products:

Carbon monoxide, carbon dioxide and unburned hydrocarbons - (smoke).

Specific hazards during fire fighting:

Vapour is denser than air – flashback may be possible over considerable distances.

Containers may explode under fire conditions - use water spray to cool unopened containers.

Do not allow run-off from fire fighting to enter drains or water courses – may cause explosion hazard in drains and may reignite on surface water.

Special protective equipment:

Wear full protective clothing and an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

Further information:

Keep adjacent containers cool by spraying with water

SECTION 6. ACCIDENTAL RELEASE MEASURES

Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).

Personal precautions:

Do not breathe fumes, vapour.

Wear personal protective equipment.

Ensure adequate ventilation and absence of sources of ignition.

Beware of accumulation of vapours in low areas or contained areas, where explosive concentrations may occur.

Methods and material for containment and cleaning up:

Contain spillage.

Small spillages can be taken up by collection with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and placed in container for disposal according to local / national regulations.

Water spillage:

If the Flash Point exceeds the Ambient Temperature by 10°C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10°C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants

Environmental precautions:

Land spillage:

Prevent further leakage or spillage if safe to do so.

Prevent spillage from entering drains, sewer, basement or confined areas.

Spillages in water or at sea:

Prevent further leakage or spillage if safe to do so.

If the spillage contaminates rivers, lakes or drains inform respective authorities.

Methods for clean up:

Additional information:

Spillages of liquid product will create a fire hazard and form an explosive atmosphere.

Ensure all equipment is non sparking or electrically bonded.

Avoid direct contact with released material.

Stay upwind.

Keep non-involved personnel away from the area of spillage.

Ensure adequate ventilation, especially in confined areas.

Reference to other sections:

Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7. HANDLING AND STORAGE

Handling:

Smoking, eating and drinking should be prohibited.

Use only in well ventilated areas.

Avoid all sources of ignition.

Use proper bonding and/or grounding procedures.

This material is a static accumulator: Take precautionary measures against static discharges.

Avoid contact with heat and ignition sources and oxidizing agents.

Containers should be opened only under exhaust ventilation hood.

Do not allow splash filling of bulk volumes.

Do not use compressed air for filling, discharging or handling.

Do not pressurise, cut, weld, braze, solder, drill, or grind on containers.

Dispose of rinse water in accordance with local and national regulations.

The vapour is heavier than air, beware of accumulation in pits and confined spaces.
The product will float on water and can be reignited on surface water.
Handle empty containers with care; vapour residue may be flammable.
Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products are followed.
Cleaning, inspection and maintenance of the internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations.

Storage:

No smoking.
Store in either mild steel or stainless steel containers or vessels.
Store in a designated cool and well-ventilated place.
Store in the original, tightly closed, container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep container tightly closed and properly labelled.
Vapour space above stored liquid may be flammable/explosive unless blanketed with inert gas.
Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.
Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

For Residues (petroleum), steam-cracked (EC#265-193-8; CAS #64742-90-1): not data

For Naphthalene: International Limit Values ¹⁾

SUBSTANCE Butyl acrylate CAS #141-32-2	LTEL 8 hr TWA ppm	LTEL 8 hr TWA mg/m ³	STEL ppm	STEL mg/m ³	Note
Austria	10	50			
Belgium	10	53	15	80	
Denmark	10	50	20	100	
European Union	10	50			Indicative Occupational Exposure Limit Values (IOELV or IOELV)
France	10	50			
Germany (AGS)	0.1	0.5 (1)	0.1	0.5 (1)	15 minutes average value (1) inhalable aerosol
Germany (DFG)					
Hungary		50			
Italy	10	50			
Poland		20		50	
Spain	10	53	15	80	skin
Sweden	10	50	15	80	
Switzerland	10	50			
The Netherlands		50		80	

USA - NIOSH	10	50	15 (1)	75 (1)	(1) 15 minutes average value
USA - OSHA	10	50			
United Kingdom	10	50	15	80	The UK Advisory Committee on Toxic Substances has expressed concern that, for the OELs shown in parentheses, health may not be adequately protected because of doubts that the limit was not soundly-based. These OELs were included in the published UK 2002 list and its 2003 supplement, but are omitted from the published 2005 list

¹⁾ GESTIS International Limit values:
http://bgia-online.hvbg.de/LIMITVALUE/WebForm_ueliste.aspx

8.1.2 DNEL/ PNEC values DN(M)ELs for workers

Exposure pattern	Route	Descriptor	DNEL / DMEL	Justification
Acute - systemic effects	Dermal			Insufficient information available to develop an overall acute systemic - dermal DNEL for this stream. Risk characterisation will focus on potential to cause serious long-term effects.
Acute - systemic effects	Inhalation	No-threshold effect and/or no dose-response information available		
Acute - local effects	Dermal			
Acute - local effects	Inhalation			
Long-term - systemic effects	Dermal	DMEL	23.4 mg/kg bw/day Corrected Dose descriptor: NOAEL: 23.4 mg/kg bw/day (based on AF of 1)	The dermal DMEL was based on the BOELV for benzene after adjusting for differences in uptake between the two routes of exposure
Long-term - systemic effects	Inhalation	DMEL	3.25 mg/m ³ Corrected Dose descriptor: BOELV: 3.25 mg/m ³ (based on AF of 1)	The BOELV for benzene was used without further modification
Long-term - local effects	Dermal	No-threshold effect and/or no dose-response information available		Insufficient information available to develop an overall long term local - dermal DNEL for this stream. Risk characterisation will focus on potential to cause serious long-term effects.
Long-term - local effects	Inhalation			

DN(M)ELs for the general population

Exposure pattern	Route	Descriptor	DNEL / DMEL	Justification
Acute - systemic effects	Dermal	No-threshold effect and/or no dose-response information available		Insufficient information available to develop an overall acute local - inhalation DNEL for this stream. Risk characterisation will focus on potential to cause serious long-term effects.
Acute - systemic effects	Inhalation			
Acute - systemic effects	Oral			
Acute - local effects	Dermal			
Acute - local effects	Inhalation			
Long-term - systemic effects	Dermal	DMEL	42.4 mg/kg bw/day Corrected Dose descriptor: NOAEL: 72 mg/kg bw/day (based on AF of 1.7)	The dermal DMEL is based on the IOELV for naphthalene after adjusting for differences in uptake between the two routes of exposure with an assessment factor of 1.7 used to account for intraspecies differences.
Long-term - systemic effects	Inhalation	DMEL	14.7 mg/m ³ Corrected Dose descriptor: NOAEC: 25.0 mg/m ³ (based on AF of 1.7)	The inhalation DMEL is based on the IOELV for naphthalene after adjusting for differences in respiratory volume between workers (light exercise) and the general population (at rest), with an assessment factor of 1.7 used to account for intraspecies differences
Long-term - systemic effects	Oral	DMEL	4.23 mg/kg bw/day Corrected Dose descriptor: NOAEL: 7.19 mg/kg bw/day (based on AF of 1.7)	The long term oral DMEL is based on the IOELV for naphthalene after adjusting for differences in uptake between the two routes of exposure with an assessment factor of 1.7 is used to reflect uncertainty when moving from the IOELV to the general population.
Long-term - local effects	Dermal	No-threshold effect and/or no dose-response information available		Insufficient information available to develop an overall long term local - inhalation DNEL for this stream. Risk characterisation will focus on potential to cause serious long-term effects.
Long-term - local effects	Inhalation			

Substance is a hydrocarbon with a complex, unknown or variable composition. Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a single representative PNEC for such substances.

Information about concentration PEC (Environmental Exposure) please see in Annex 2 of this SDS.

8.2 Exposure Controls

Personal protective equipment

Eye protection:

Wear approved safety goggles (chemical splash goggles /chemical monogoggles). Approved to EU Standard EN166.

Do not wear contact lenses in any work area.

Respiratory protection:

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where airfiltering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations.

Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C, e. g. EN 14387].

Hand protection:

Wear approved protective gloves.

Select gloves tested to a relevant standard (e.g. Europe EN374, US F739).

In case of immersion:

recommended material: fluorinated polymer or PVC layer thickness: all thicknesses, penetration time according to norm EN 374-3 > 480 minutes.

In case of contact with spray: recommended material: nitrile layer thickness > 0,4 mm, penetration time according to norm EN 374-3 > 30 minimum

When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable (breakthrough time of > 240 minutes). For incidental contact/splash protection Neoprene, PVC gloves may be suitable.

Remarks: Gloves may degrade in contact with this chemical.

- Carefully check the glove for cracks or damage before reusing it, dispose of gloves where the penetration time is exceeded.

- The penetration time depends on temperature, glove material, thickness and construction.

Penetration time is measured against EN 374 in laboratory conditions corresponding to permanent static contact and is not necessarily representative of the risk in the workplace.

Contact the gloves' supplier for further information on the selection and resistance of gloves.

Body protection:

Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).

Skin and body protection shower and eye fountain available.

General safety and hygiene measures:

Handle in accordance with good industrial hygiene and safety procedures. Avoid producing or diffusing fumes, vapour or spray into the air (particularly during loading or unloading product).
 Avoid contact with skin (wear gloves tested to EN374) and eyes (wear goggles/spectacles; do not wear contact lenses in any work area).
 Avoid splashes (where exposure is likely, protective clothing must be worn, shower and eye fountain available must be available etc...).

Do not wipe hands with cloths or rags which have been used for cleaning.
 Remove all contaminated clothing and remove protective clothing when the work is completed.
 Wash skin as soon as possible with soap and water; do not store near food products.
 When using, do not eat, drink or smoke.

Monitoring methods:

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls.

Environmental exposure control measures:

Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

For more information please see Risk Management Measures in Annex 1 and The Relevant Exposure Scenario in Annex 3 of this SDS

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	Remarks
Physical state at 20°C and 1013 hPa	liquid	
Colour	dark brown	
Odour	Like naphthalene/aromatics not applicable, of very low solubility	
pH value	not applicable	
Melting / freezing point	The melting point range is between -63°C and 43°C	Measured OECD Guideline 102 (Melting point /Melting Range) BASF 2007
Boiling point	The boiling point range for this Category: 72 - 390°C. These products contain a fraction that doesn't boil (non-volatile residue)	Measured OECD Guideline 103 (Boiling point/boiling range) BASF 2007; Exxon 2004; LOA 2009
Relative density	The relative density range for this Category: 0.964 - 1.11 at 20°C	Measured ASTM 4052 BASF SE 2008; Dow Benelux BV 2010

Property	Value	Remarks
Vapour pressure	The vapour pressure range for this Category at a temperature range of between 19.9 and 25°C: 211- 2592 Pa. at a temperature range of between 49.7 and 50°C: 750-5150 Pa.	Measured OECD Guideline 104 (Vapour Pressure Curve) Sabic 1989 BASF SE 2007-2008; Exxon 2004; LOA 2009
Water solubility	Water solubility for this Category: in the range 25 - 41mg/l.	Measured OECD Guideline 105 (Water Solubility) Sabic 1989; BASF 2007-2008
Partition coefficient n-octanol/water (log value)	The Partition Coefficient range for this Category: >3.0 and <6.5	Measured EEC Method A8 OECD 117 BASF SE 2008; Exxon 2004
Viscosity	Viscosity for this category: 215 mPa s at 40°C (dynamic) >20.5 mm ² /s at 40°C (kinematic)	Measured OECD Test Guideline 114 (Viscosity of Liquids) BASF SE 2008; RÜTGERS 2010a;
Flash point	The flashpoint for this Category: in the range of 52 - 145°C 60.5°C	Measured ASTM 93; EEC Method A4 OECD 104 BASF 2007; Dow Benelux BV 2010 ASTM D 93(B)
Flammability	Flammable upon ignition.	Flammability derived from flash point. Based on chemical structure pyrophoric properties and flammability in contact with water are not to be expected. In accordance with section 1 of REACH Annex XI, the flammability is deduced from flash point and boiling point.
Explosive properties	non explosive	There are no chemical groups associated with explosive properties present in the molecule. In accordance with column 2 of REACH Annex VII, the explosiveness of the substance does not need to be tested, because there are no chemical groups associated with explosive properties in the molecule
Self-ignition temperature	Autoflammability for this Category is in the range: 453-480 °C	Measured DIN EN 14522 BASF AG 2007
Oxidising properties	not applicable	The Substance is incapable of reacting exothermically with combustible materials. In accordance with column 2 of REACH Annex VII, the oxidising properties do not need to be tested, because the substance is incapable of reacting exothermically with combustible materials on the basis of the

Property	Value	Remarks
		chemical structure.
Stability in organic solvents and identity of relevant degradation products	not applicable	In accordance with column 1 of REACH Annex IX, the test does not need to be conducted because the stability of the substance is not considered as critical
Dissociation constant	not applicable	In accordance with the General Rules for Adaptation of the Standard Testing Regime (Annexes VII-X) as stated in REACH Annex XI, this can be waived as the substance does not have any functional groups that dissociate and therefore testing does not appear scientifically necessary
Granulometry	not applicable	Substance is marketed or used in a non solid or granular form. In accordance with column 2 of REACH Annex VII, the particle size distribution (Granulometrie) study does not need to be performed as the substance is marketed or used in a non solid or granular form.
Surface tension	72.1 mN/m at 20 °C The surface tension of an aqueous preparation of one stream within this Category (90% saturation)	Measured OECD Guideline 115 (Surface Tension of Aqueous Solutions) BASF 2007

SECTION 10. STABILITY AND REACTIVITY

Chemical stability:

Stable under normal operating conditions of storage, handling and use
Flammable: the product is combustible if heated above the flash point.

Reactivity:

Oxidises on contact with air.

Conditions to avoid:

Keep away from sources of ignition. No smoking. Containers must be closed to prevent ingress of moisture.
Avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks

Materials to avoid:

Avoid contact with strong oxidizing materials

Hazardous decomposition products:

At complete combustion, with an excess of oxygen forms: carbon dioxide (CO₂) and water vapour.
At partial combustion, forms also: carbon monoxide (CO), soot and cracked products: aldehydes, ketones

SECTION 11. TOXICOLOGICAL INFORMATION

Property	Results	Remarks
Acute toxicity:	Oral: No classification required for streams containing < 25% naphthalene. Low dermal and inhalation toxicity following single exposure – no classification required.	
Oral	LD50: >2000 mg/kg bw (rat, male/female)	key study, experimental result OECD Guideline 401 (Acute Oral Toxicity), TNO (1989a)
Inhalation	LC50 (7 h): > 1.6 mg/L air bw (rat, male/female, vapour)	key study, experimental result OECD Guideline 403 (Acute Inhalation Toxicity), BASF (1983b)
Dermal	LD50 (dermal): >2000 mg/kg bw (rat, male/female, occlusive)	key study, experimental result OECD Guideline 402 (Acute Dermal Toxicity), TNO (1989b)
Irritation/Corrosivity:		
Eye: no classification required for streams containing <10% benzene, xylenes, biphenyl and/or styrene. Skin: skin Irritation; H315: Causes skin irritation (cat. 2). Respiratory tract: no classification required for streams containing <10% biphenyl		
Skin irritant	rabbit (24, 48, 72 h): irritating	key study, experimental result EPA OTS 798.4470 UBTL (1990c) OECD Guideline 404 (Acute Dermal Irritation / Corrosion) BASF (1983c)
Eye irritant	rabbit (24, 48, 72 h): not irritating	key study, experimental result OECD Guideline 405 (Acute Eye Irritation / Corrosion) TNO (1989d); UBTL (1990d); BASF (1994c)
Respiratory tract	This information is not available	There are no specific data on any of the streams but two component substances (ethylbenzene and biphenyl) are considered to be irritating to the respiratory tract. For ethylbenzene RD50 values of 1432 or 4060 ppm (6215 to 17620 mg/m ³) for sensory irritation were determined in different strains of mice (EU, 2008b).Biphenyl is classified as irritating to the respiratory tract. Fuel Oils streams containing ≥10% biphenyl should be classified “May cause respiratory irritation” Category 3 H335 under Reg (EC) 1272/2008
Sensitisation:	No data have been found concerning respiratory sensitisation and there	

Property	Results	Remarks
	are no indications that components within this stream are respiratory allergens	
Skin sensitization	guinea pig: not sensitizing	key study, experimental result EPA OTS 798.4100 (Skin Sensitisation) UBTL (1990e)
Respiratory system	This information is not available	No specific animal or human data have been found with regard to respiratory sensitisation for any components within this stream
Repeated dose toxicity	No classification required for streams containing < 1% benzene, < 10% ethylbenzene, <10% styrene and < 10% toluene.	
Oral	<p><i>read-across based on grouping of substances (category approach): benzene</i> NOAEL(nominal): 100 mg/kg bw/d (rat, male) LOAEL (nominal): 200 mg/kg bw/d (rat, male) LOAEL(nominal): 25 mg/kg bw/d (rat, male)</p> <p><i>read-across based on grouping of substances (category approach): toluene</i> NOAEL(nominal): 625 mg/kg bw/d (rat, male/female) LOAEL: 1250 mg/kg bw/d (rat, male/female)</p>	<p>key study, experimental result OECD TG 408 (Repeated Dose 90-Day Oral Toxicity in Rodents) NTP (1986)</p> <p>Method B.26 (Sub-Chronic Oral Toxicity Test: Repeated Dose 90-Day Oral Toxicity Study in Rodents) (Cited as Directive 87/302/EEC, part B, p. 8) NTP (1990)</p>
Inhalation	<p><i>read-across based on grouping of substances (category approach): benzene</i> NOAEC (nominal) : 30 ppm (rat, male) NOAEC (nominal) : 96 ppm (rat, male/female)</p> <p><i>read-across based on grouping of substances (category approach): toluene</i> NOAEC: 625 ppm (rat, male/female) NOAEC (nominal) : 2355 ppm (rat, male/female) LOAEL: 1250 ppm (rat, male/female) LOAEL(nominal): 4710 ppm (rat, male/female)</p>	<p>key study, experimental result OECD TG 413 (Subchronic Inhalation Toxicity: 90-Day) OECD Guideline 412 (Repeated Dose Inhalation Toxicity: 28/14-Day) Ward CO, Kuna RA, Snyder NK, Alsaker RD, Coate WB and Craig PH. (1985)</p> <p>EU Method B.29 (Sub-Chronic Inhalation Toxicity Test: 90-Day Repeated Inhalation Dose Study Using Rodent Species) (Cited as Directive 87/302/EEC, part B, p. 20) NTP (1990)</p>

Property	Results	Remarks
Dermal	<i>read-across based on grouping of substances (category approach): fuel oil (nominal boiling range 204-538°C)</i> LOAEL(nominal): 50 mg/kg bw/d (rabbit, male/female)	OECD Guideline 410 (Repeated Dose Dermal Toxicity: 21/28-Day Study) McKee RH, Kapp RW and Ward DP (1985)
Mutagenicity:	May cause heritable genetic damage Fuel Oils streams are classified as Mutagenic and labelled as follows: “May cause heritable genetic effects” Cat 2, R46 under Dir 1999/45/EC and “May cause genetic defects” Cat 1B, H340 under Reg (EC) 1272/2008.	
In vitro data	positive <i>Test material: CAS # 64742-90-1</i>	supporting study, experimental result OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test) Gulf Life Sciences (1984b)
In vivo data	positive <i>read-across based on grouping of substances (category approach): benzene</i>	supporting study, experimental result OECD Guideline 475 (Mammalian Bone Marrow Chromosome Aberration Test); Ciranni R(1991)
Carcinogenicity:	Carc. 1B; H350: May cause cancer	
Oral	Neoplastic effects: yes LOAEC (carcinogenicity): 50 mg/kg bw/d (nominal/rat, male); LOAEC (carcinogenicity): 25 mg/kg bw/d (nominal/rat, female) <i>read-across based on grouping of substances (category approach): benzene</i>	key study, experimental result EPA OPP 83-5 (Combined Chronic Toxicity / Carcinogenicity) NTP (1986)
Dermal	Neoplastic effects: yes no NOAEC identified (carcinogenicity) <i>test material: pyrolysis fuel oil (water quench pyrolysis fuel oil and oil quench pyrolysis fuel oil)</i>	key study, experimental result Weil CS and Condra NI (1977)
Toxicity for reproduction:	No effect on reproductive organs There are sufficient data available on component substances to conclude that streams within this class that contain less than 5% (EU/DPD) or 3% (GHS/CLP) toluene are not reproductive or developmental toxicants and do not require a label for these endpoints.	
Effects on fertility	NOEC (reproductive toxicity): 500 mg/kg bw/d (nominal) (rat; male/female) no evidence of reproductive toxicity <i>Test material: experimental fuel oil (nominal boiling range 200-538°C)</i>	supporting study, experimental result OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test) McKee RH, Plutnick RT (1987)
Developmental toxicity	rat; oral NOAEL (maternal toxicity):	supporting study, experimental result OECD Guideline 414 (Prenatal

Property	Results	Remarks
	100 mg/kg bw/d (nominal); NOAEL (developmental toxicity): 100 mg/kg bw/d (nominal); NOAEL (teratogenicity): 1000 mg/kg bw/d (nominal)	Developmental Toxicity Study) McKee RH, Pasternak SJ and Traul KA (1987) <i>Test material: experimental fuel oil (nominal boiling range 204-538°C)</i>
Other effects:	none	

SECTION 12. ECOLOGICAL INFORMATION

Property	Value	Remarks
AQUATIC TOXICITY		
Fish:		
Short-term toxicity	A range of proprietary studies were available for members of this Category which reported an LC50 of between 1.0 and 220 mg/L LC50 (96 h): 1.0 mg/L test mat. <i>(Oncorhynchus mykiss/ freshwater)</i> <i>Test material: CAS #: 68513-69-9</i> LC50 (96 h): 4.4 mg/L test mat. <i>(Oncorhynchus mykiss/ freshwater)</i> <i>Test material: CAS #: 69013-21-4 and 68513-69-9</i> LC50 (96 h): > 22 — < 32 mg/L <i>(Leuciscus idus /freshwater)</i> <i>Test material: Rohnapthalin Gemisch H</i> LC50 (96 h): 220 mg/L test mat. <i>Brachydanio rerio (Danio rerio) /freshwater)</i> <i>Test material: CAS #:98072-36-7</i>	key study, experimental result OECD Guideline 203 (Fish, Acute Toxicity Test) ExxonMobil Biomedical Sciences, Inc. (2003a) DIN 38 412 BASF Aktiengesellschaft Abteilung Toxikologie (1983) OECD Guideline 203 (Fish, Acute Toxicity Test) BASF Aktiengesellschaft Department of Toxicology (1984)
Long-term toxicity to fish: Not applicable In accordance with column 2 of REACH Annex IX, the long term testing on fish does not need to be conducted as the chemical safety assessment according to Annex I has not indicated a need to investigate further the effects on aquatic organisms		
Aquatic invertebrates:		
Short-term toxicity <i>(Daphnia Magna)</i>	EC50 (48 h): 13 mg/L test mat. (nominal) <i>Test material: Petrinex 6R</i> EC50 (48 h): 2.4 mg/L test mat. (nominal) based on: swimming ability <i>Test material: CAS # 85117-10-8</i>	key study, experimental result OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test) Brixham Environmental Laboratory Astrazeneca UK ltd (2004) BASF Aktiengesellschaft Experimental Toxicology and Ecology (2007)

	<p>EC50 (48 h): 1.2 mg/L test mat. based on: mobility EC50 (48 h): 2.7 mg/L test mat. based on: mobility <i>Test material: CAS # 68513-69-9</i> EC50 (48 h): 2.7 mg/L test mat. based on: mobility <i>Test material CAS #:69013-21-4</i></p>	<p>ExxonMobil Biomedical Sciences, Inc (2003)</p>
Long-term toxicity	Not applicable	<p>In accordance with column 2 of REACH Annex IX, the long term testing on invertebrates does not need to be conducted as the chemical safety assessment according to Annex I has not indicated a need to investigate further the effects on aquatic organisms.</p>
Algae and aquatic plants	<p>ErC50 values: 1.6 - 12.2 mg/l and the ErL50 range was 1.5 -2.3 mg/l</p> <p>EC50 (72 h): 2.56 mg/L (nominal) based on: biomass EL50 (72 h): 8.95 mg/L (nominal) based on: growth rate <i>(Selenastrum capricornutum, new name: Pseudokirchnerella subcapitata) (algae)</i> <i>Pseudokirchnerella subcapitata (algae)</i> Test material: CAS #68513-69-9</p>	<p>key study, experimental result OECD Guideline 201 (Alga, Growth Inhibition Test) Brixham Environmental Laboratory (2004b)</p> <p>ExxonMobil Biomedical Sciences, Inc. (2003)</p>
Toxicity to aquatic micro-organisms	<p>EC10 (180 min): 220 mg/L (nominal) EC50 (180 min): 470 mg/L (nominal)</p> <p>activated sludge Test material: CAS # 85117-10-8</p>	<p>key study, experimental result OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test) Experimental Toxicology and Ecology BASF Aktiengesellschaft (2007b)</p>
<p>Sediment organisms: Not applicable In accordance with column 2 of REACH Annex X, the long term toxicity to sediment organisms study does not need to be conducted as the chemical safety assessment according to Annex I has not indicated a need to investigate further the effects of the substance and/or degradation products on sediment organisms</p>		
<p>Toxicity to soil macro-organisms: In accordance with column 2 of REACH Annex IX in the absence of toxicity data for soil organisms, the equilibrium partitioning method has been applied to assess the hazard to soil organisms. Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for the risk assessment of this complex substance. For the purpose of risk assessment, soil PNECs for hydrocarbon blocks have been derived using aquatic PNECs and the equilibrium partitioning method (EqP) using representative structures (<i>see in Annex 2 of this SDS</i>).</p>		
<p>Toxicity to soil micro-organisms: Not applicable In accordance with column 2 of REACH Annex IX, the effects on soil microorganisms study does not need to be conducted as direct and indirect exposure of the soil compartment is unlikely.</p>		

<p>Toxicity to terrestrial plants: Not applicable In accordance with column 2 of REACH Annex X, the long term toxicity testing on invertebrates study does not need to be conducted as the chemical safety assessment according to Annex I has not indicated a need to investigate further the effects of the substance and/or degradation products on terrestrial organisms.</p>		
<p>Toxicity to birds: Not applicable In accordance with column 2 of REACH Annex X, the study on birds does not need to be conducted as sufficient reliable data is available from the mammalian dataset.</p>		
<p>Secondary poisoning: Not applicable The marker substances for this category (benzene, toluene, ethylbenzene, styrene, naphthalene and biphenyl) are not bioaccumulative and therefore this assessment is not required.</p>		
<p>DEGRADATION Members of this Category have not been shown to be readily biodegradable. Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.</p>		
<p>Abiotic degradation:</p>		
Hydrolysis	Not applicable	In accordance with section 1 of REACH Annex XI, the hydrolysis study does not need to be conducted as this substance is not expected to undergo hydrolysis in the environment due to a lack of hydrolysable functional groups and therefore testing does not appear scientifically necessary
Phototransformation in air	Not applicable	Standard tests for atmospheric oxidation half-lives are intended for single substances and are not appropriate for this complex substance.
<p>Biodegradation:</p>		
Biodegradation in water	Biodegradation range 7.3-29% after 28 d (O ₂ consumption)	key study, experimental result OECD Guideline 301 F (Ready Biodegradability: Manometric Respirometry Test) Exxon Mobile Biomedical Sciences Inc (2004)
Biodegradation in soil	Half-life (DT50): ranged from 4.4 weeks to >48 weeks Test material: CAS # 68476-33-5	key study, experimental result study was available which provides data of the half life of fuel oils with similar carbon ranges to the members of this Category. The half lives of the fuel oils considered depending on soil type, incubation temperature or the amount of fuel added to the soil. Song Hong-Gyu, Wang Xiaoping, Bartha Richard (1990)

ENVIRONMENTAL DISTRIBUTION		
Adsorption/desorption	adsorption (soil) Adsorption coefficient: log K _{oc} : 2.44 — 4.55	key study, estimated by calculation (Q)SAR Test material (CAS name): Indane (C9), Indene (C9), Naphthalene (C10), Pseudocumene C9, Ethyl benzene C8, Styrene C8, Pentamethylbenzene C11, Heptylbenzene C13 Sabljić and Gusten (1995)
Volatilization	Not applicable	Volatilisation is dependent on Henry's Constant (HC) which is not applicable to complex substances.
BIOACCUMULATION:		
Aquatic bioaccumulation	BCF: 39 — 18220	key study, estimated by calculation (Q)SAR Test material: Indane (C9), Dodecane (C12), Indene (C9), Naphthalene (C10), Cyclohexene-4-ethenyl-4methyl-3-(1-methyl ethenyl)-1-(1-methyl)-(3R-trans)-(9C1) C15, Pseudocumene C9, Ethyl benzene C8, Styrene C8, Pentamethylbenzene C11, Heptylbenzene C13 USEPA (2008)
<u>PBT/vPvB Properties</u>	Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity it can be stated that the substance does not fulfill the PBT criteria (not PBT) and not the vPvB criteria (not vPvB)	

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal of contaminated packaging:

Empty bags may contain flammable or explosive vapour.
Dispose in a safe manner in accordance with local/national regulations.
Do not dispose into the environment, in drains or in water courses.
Recover or recycle if possible. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations.

Local Legislation:

EU Waste Disposal Code (EWC): 13 07 03 wastes of liquid fuels, other fuels (including mixtures).
Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

For more information please see the relevant exposure scenario in Annex 3 of this SDS.

SECTION 14. TRANSPORT INFORMATION

Land transport:

ADR

ID number: UN 3082
Hazard class: 9
Packing group: III
Hazard label: 9
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Residues (petroleum), steam-cracked)

RID

ID number: UN 3082
Hazard class: 9
Packing group: III
Hazard label: 9
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Residues (petroleum), steam-cracked)

Inland waterway transport (AND):

ID number: UN 3082
Hazard class: 9
Packing group: III
Hazard label: 9, N1
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Residues (petroleum), steam-cracked)

Sea transport (IMDG Code):

ID number: UN 3082
Hazard class: 9
Packing group: III
Marine pollutant: Yes
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Residues (petroleum), steam-cracked)

Air transport (IATA/ICAO):

ID number: UN 3082
Hazard class: 9
Packing group: III
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Residues (petroleum), steam-cracked)

SECTION 15. REGULATORY INFORMATION

REGULATORY

Chemical Safety Report has been performed for Residues (petroleum), steam-cracked (EC#265-193-8; CAS #64742-90-1)

Annex 3 to the e-SDS: Exposure scenarios.

KEY LITERATURE REFERENCES AND SOURCES

DOCUMENTS, PROVIDED BY LOA CONSORTIUM: CHEMICAL SAFETY REPORT to Residues (petroleum), steam-cracked (EC#265-193-8; CAS #64742-90-1).

EU DIRECTIVES

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Regulations. Commission regulation (EU) no 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

DIRECTIVE 1999/45/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations

Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances.

COMMISSION DECISION of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes (notified under document number (2001/118/EC).

UK REGULATORY REFERENCES

Chemicals (Hazard Information & Packaging) Regulations. The Control of Substances Hazardous to Health Regulations 1988. Health and Safety at Work Act 1974.

ENVIRONMENTAL LISTING

Control of Pollution Act 1974.

STATUTORY INSTRUMENTS

Notification of New Substances Regulations (NONS) 1993. The Export and Import of Dangerous Chemicals Regulations 2005 number 928.

VERSION: 1.0
DATE CREATED: 15/08/2012

APPROVED CODE OF PRACTICE

Classification and Labelling of Substances and Preparations Dangerous for Supply (EU 2001/59/EC).
Safety Data Sheets for Substances and Preparations (REACH).

GUIDANCE NOTES

Workplace Exposure Limits EH40. Introduction to Local Exhaust Ventilation HS(G)37. CHIP for everyone HSG(108).

NATIONAL REGULATIONS

The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. No. 1689.

Workplace Exposure Limits 2005 (EH40).

The Carriage of Dangerous Goods and use of transportable pressure equipment regulations 2004.

Control of Substances hazardous to health regulations 2002 (as amended).

NATIONAL REGULATIONS (GERMANY)

Major Accident Hazard Legislation 82/501/EWG.

SECTION 16. OTHER INFORMATION

16.1. Indication of changes

VERSION	Date of change	Section	Description of changes
Version: 1.0	15/08/2012		The first edition

16.2 Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
AGS	The German Committee on Hazardous Substances (Ausschuss für Gefahrstoffe – AGS)
BOULV	Binding Occupational Exposure Limit Values
BCF	Bioconcentration factor
DFG	Germany Research Foundation
DNEL	Derived No Effect Level
ErC50	Means EC50 in terms of reduction of growth rate
EC50	Half effective concentration; the molarity of an agonist that produces 50% of the maximal possible effect of that agonist
ErL50 and EbL50	Are defined as the effective loading rate of the test substance that reduced growth rate and biomass, respectively, by 50% as compared with the control
IOELV	Indicative Occupational Exposure Limit Values
IMDG	International Maritime Dangerous Goods
ICAO-TI	Technical Instructions for the Safe Transport of Dangerous Goods by Air
K _{oc}	Adsorption coefficient
K _{ow}	octanol-water partition coefficient
LC50	Lethal Concentration to 50 % of a test population
LD50	Lethal Dose to 50% of a test population (Median Lethal Dose)
LOAEC	Lowest Observable Adverse Effect Concentration
LTEL	Long Term Exposure Limit
NIOSH	National Institute for Occupational Safety and Health (<i>USA CDC</i>)
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
OECD	Organization for Economic Co-operation and Development
OSHA	Occupational Safety & Health Administration (<i>USA</i>)
PEC	Predicted No Effect Concentration
PNEC	Predicted No Effect Concentration
PBT	Persistent, bioaccumulative, toxic chemical
vPvB	Very Persistent, Very Bioaccumulative
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
STEL	Short Term Exposure Limit
STOT	Specific Target Organ Toxicity
(STOT) RE	Repeated Exposure
(STOT) SE	Single Exposure
TWA	Time Weighted Average
UN	United Nations
WGK	Wassergefährdungsklasse (<i>German: Water Hazard Class</i>)

16.3 Relevant R-phrases, Hazard- and EU Hazard-statements

R-phrases:

R10 Flammable.
R11 Highly flammable
R20 Harmful by inhalation
R22 Harmful if swallowed
R38 Irritating to skin
R36/38 Irritating to eyes and skin
R36/37/38 Irritating to eyes, respiratory system and skin
R40 Limited evidence of a carcinogenic effect
R45 May cause cancer
R46 May cause heritable genetic damage
R48/20 danger of serious damage to health by prolonged exposure through inhalation
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R63 Possible risk of harm to the unborn child
R65 Harmful: may cause lung damage if swallowed
R67 Vapours may cause drowsiness and dizziness

Safety Advice (S-phrases):

S36/37 - wear suitable protective clothing and gloves
S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S53 - avoid exposure - obtain special instructions before use
S29 - do not empty into drains
S61 - avoid release to the environment. refer to special instructions/safety data sheets

Hazard statement:

H225 Highly flammable liquid and vapour
H226 Flammable liquid and vapour
H302 Harmful if swallowed
H315 Causes skin irritation
H319 Causes serious eye irritation
H332 Harmful if inhaled
H335 May cause respiratory irritation
H336 May cause drowsiness or dizziness
H340 May cause genetic defects
H350 May cause cancer
H351 Suspected of causing cancer
H361 Suspected of damaging fertility or the unborn child
H373 May cause damage to organs through prolonged or repeated exposure
H400 Very toxic to aquatic life
H410 Very toxic to aquatic life with long lasting effects
H411 Toxic to aquatic life with long lasting effects

Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood
P280: Wear protective gloves/protective clothing/eye protection/face protection

P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P332+P313: If skin irritation occurs: Get medical advice/attention
P273: Avoid release to the environment
P391: Collect spillage

Additional precautionary statements (to avoid ignition of the substance):

Prevention:

P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking

P233 Keep container tightly closed.

P240: Ground/bond container and receiving equipment.

P241: Use explosion-proof electrical/ventilating/lighting/.../ equipment.

P242: Use only non-sparking tools.

P243: Take precautionary measures against static discharge.

Response:

P370 + P378: In case of fire: Use ... for extinction.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P501: Dispose of contents

16.4 List of ES (exposure scenario) given in Annex 3 to the extended SDS

Manufacture of the substance

Distribution

Use as an Intermediate

Formulation

Functional Fluids

Use as a fuel industrial

Use as a fuel professional

Use as a fuel consumer

DISCLAIMER

This information is based on our current level of knowledge. This information may be subject to revision as new knowledge and experience becomes available, and SIBUR makes no warranties and assumes no liability in connection with any use of this information. Since SIBUR cannot be aware of all aspects of your business and the impact the REACH Regulation has for your company, SIBUR strongly encourages you to get familiar with the REACH Regulation in order to comply with its requirements and timelines.



Annex 1

Relevant identified uses of the substance

Table 1. Uses by workers in industrial settings

Identified Use (IU) name	Use descriptors	Risk Management Measures
Manufacture	<p>Process category (PROC):</p> <p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC):</p> <p>ERC 1: Manufacture of substances</p> <p>ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>Sector of end use (SU):</p> <p>SU 8: Manufacture of bulk, large scale chemicals</p>	<p>Clear spills immediately [C&H13].</p> <p>Sample via a closed loop or other system to avoid exposure [E8]</p> <p>Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour) [E11] or [G9].</p> <p>Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12].</p> <p>Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].</p> <p>Handle substance within a closed system [E47].</p> <p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Drain down and flush system prior to equipment break-in or maintenance [E55].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure operation is undertaken outdoors [E69].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Store substance within a closed system [E84].</p> <p>Retain drain downs in sealed storage pending disposal or for</p>



	<p>(including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	<p>subsequent recycle [ENVT4]. Consider the need for risk based health surveillance. [G20]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
<p>Distribution</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 1: Manufacture of substances</p>	<p>Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general or controlled ventilation (not less than 3 to 5 air changes per hour) [E11] or [G9] Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49]. Transfer via enclosed lines [E52]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69].</p>



	<p>ERC 2: Formulation of preparations ERC 3: Formulation in materials ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b: Industrial use of reactive processing aids ERC 6c: Industrial use of monomers for manufacture of thermoplastics ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers ERC 7: Industrial use of substances in closed systems</p> <p>Sector of end use (SU): SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	<p>Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Avoid carrying out activities involving exposure for more than 1 hour [OC 27]. Avoid carrying out activities involving exposure for more than 4 hours [OC 28]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
<p>Use as an Intermediate</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p>	



	<p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>Sector of end use (SU): SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: SU 3</p>	
Formulation	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers</p>	<p>Clear spills immediately [C&H13] Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11] or [G9]. Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. [E12]. Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].</p>



	<p>at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent</p> <p>Environmental release category (ERC): ERC 2: Formulation of preparations</p> <p>Sector of end use (SU): SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 0: Other: 3</p>	<p>Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69] Consider the need for risk based health surveillance. [G20]. Ensure operation is undertaken outdoors [E69]. Ensure material transfers are under containment or extract ventilation [E66]. Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Avoid carrying out activities involving exposure for more than 15 minutes [OC26]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]. Wear suitable coveralls to prevent exposure to the skin [PPE27].</p>
<p>Functional Fluids</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p>	<p>Clear spills immediately [C&H13]. Sample via a closed loop or other system to avoid exposure [E8]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or [G9]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40] Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54].</p>



	<p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental release category (ERC): ERC 7: Industrial use of substances in closed systems</p> <p>Sector of end use (SU): SU 0: Other: SU 3 Industrial</p>	<p>Drain down and flush system prior to equipment break-in or maintenance [E55]. Drain down system prior to equipment break-in or maintenance [E65]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]. Use dry break couplings for material transfer [E75]. Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
<p>Use as a fuel industrial</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers</p>	<p>Clear spills immediately [C&H13]. Sample via a closed loop or other system to avoid exposure [E8] Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11] or [G9]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Handle substance within a closed system [E47]. Handle substance within a predominantly closed system provided with extract ventilation [E49] Use drum pumps [E53]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or</p>



	<p>at dedicated facilities PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>Environmental release category (ERC): ERC 7: Industrial use of substances in closed systems</p> <p>Sector of end use (SU): SU 0: Other: SU 3 Industrial</p>	<p>maintenance [E55]. Drain down system prior to equipment break-in or maintenance [E65]. Ensure operation is undertaken outdoors [E69]. Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Consider the need for risk based health surveillance. [G20]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear suitable gloves tested to EN374 [PPE15] Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</p>
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Table 2. Uses by professional workers

Identified Use (IU) name	Use descriptors	Risk Management Measures
Use as a fuel professional	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers</p>	<p>Clear spills immediately [C&H13]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11] or [G9] Clear transfer lines prior to de-coupling [E39]. Handle substance within a closed system [E47]. Provide extract ventilation to points where emissions occur [E54]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use drum pumps or carefully pour from container [E64]. Drain down system prior to equipment break-in or</p>



	<p>at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>Environmental release category (ERC): ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems</p> <p>Sector of end use (SU): 22</p>	<p>maintenance [E65]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69] Store substance within a closed system [E84]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. Consider the need for risk based health surveillance. [G20]. Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 1 hour [OC27]. Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].</p>
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Table 3. Uses by consumers

Identified Use (IU) name	Use descriptors	Risk Management Measures
Use as a fuel consumer	<p>Chemical product category (PC): PC 13: Fuels</p> <p>Environmental release category (ERC): ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems</p>	No specific RMMs developed beyond those OCs stated

Most common technical function:

- Intermediates
- Fuels and fuel additives



**Annex 2
ENVIRONMENTAL EXPOSURE**

Table 2.1. Local CSR Worksheet

Table of Local Exposure and Risk Characterisation Results from PETRORISK	local output- Manufacture	local output- Distribution	local output- Use as Inter	local output- Formulation	local output- Use as a fuel	local output- Use as a fuel	local output- Use as a fuel	local output- Functional
Section - Exposure Assessment	9.1	9.3	9.2	9.4	9.6	9.7	9.8	9.5
Regional Tonnage (T/yr)	2.0E+05	1.0E+05	2.0E+04	8.0E+04	1.1E+05	1.6E+04	8.0E+03	1.0E+02
Fraction of regional tonnage used locally	8.0E-01	2.0E-03	7.5E-01	3.8E-01	1.4E+00	5.0E-04	5.0E-04	1.0E-01
Local Site Tonnage (T/y)	1.6E+05	2.0E+02	1.5E+04	3.0E+04	1.6E+05	8.0E+00	4.0E+00	1.0E+01
Site Tonnage (kg/d)	5.3E+05	1.0E+04	5.0E+04	1.0E+05	5.3E+05	2.2E+01	1.1E+01	5.0E+02
Emission days (d/yr)	300	20	300	300	300	365	365	20
Release fraction (prior to RMM) - wastewater	1.0E-04	1.0E-05	3.0E-04	2.0E-04	1.0E-05	1.0E-05	1.0E-05	3.0E-05
Release fraction (prior to RMM) - air	1.0E-02	1.0E-03	1.0E-03	1.0E-03	5.0E-03	1.0E-03	1.0E-03	5.0E-03
Dilution Factor - Freshwater	40	10	10	10	10	10	10	10
Dilution Factor - Marine	100	100	100	100	100	100	100	100
On-site removal efficiency - Air (%)	90.0	90.0	80.0	0.0	95.0	0.0	0.0	0.0
Risk-driving Comparment	Human Inhalation	Human Ingestion	Human Ingestion	Human Ingestion	Human Inhalation	Human Ingestion	Human Ingestion	Human Inhalation
Wastewater Treatment Required (Yes/No)	Yes	No	Yes	Yes	Yes	No	No	No
Required Removal Efficiency - wastewater (%)	43.6	0.0	99.7	82.8	35.5	0.0	0.0	0.0



Onsite Removal Efficiency - wastewater (%)	0.0	0.0	94.9	0.0	0.0	0.0	0.0	0.0
Offsite Removal Efficiency - wastewater (%)	94.9	94.9	94.9	94.9	94.9	94.9	94.9	94.9
Total Removal Efficiency - wastewater (%)	94.9	94.9	99.7	94.9	94.9	94.9	94.9	94.9
M safe (kg/d)	5.3E+05	2.2E+05	5.0E+04	1.0E+05	5.3E+05	8.0E+02	4.1E+02	1.2E+04
Aquatic without Treatment (kg/d)	5.5E+01	2.7E+00	1.6E+01	4.4E+01	3.1E+00	4.4E-01	2.2E-01	8.2E-03
Aquatic (with onsite and offsite treatment) (kg/d)	5.2E+01	2.6E+00	1.6E+01	4.2E+01	2.9E+00	4.2E-01	2.1E-01	7.8E-03
Air (direct after on-site treatment) (kg/d)	5.7E+02	2.8E+01	1.7E+01	2.3E+02	7.8E+01	4.4E+01	2.2E+01	1.4E+00
Environmental Exposure								
PEC effluent (mg/L)	2.8E-01	2.6E-03	3.9E-01	5.2E-01	1.4E-01	5.7E-06	2.8E-06	3.9E-04
PEC sludge (mg/kg dw)	6.8E+02	6.4E+00	9.6E+02	1.3E+03	3.4E+02	1.4E-02	7.0E-03	9.6E-01
PEC air (mg/m ³)	1.2E-01	3.3E-05	3.8E-03	2.5E-02	3.1E-02	1.7E-05	1.7E-05	3.8E-05
C air (mg/m ³)	1.2E-01	1.6E-05	3.8E-03	2.5E-02	3.1E-02	2.6E-08	1.3E-08	2.1E-05
PEC freshwater (mg/L)	6.9E-03	2.6E-04	3.9E-02	5.2E-02	1.4E-02	1.5E-05	1.5E-05	3.9E-05
C freshwater (mg/L)	6.9E-03	2.5E-04	3.9E-02	5.2E-02	1.4E-02	5.7E-07	2.8E-07	2.4E-05
PEC marine (mg/L)	2.8E-03	2.6E-05	3.9E-03	5.2E-03	1.4E-03	1.3E-07	1.0E-07	3.9E-06
C marine (mg/L)	2.8E-03	2.6E-05	3.9E-03	5.2E-03	1.4E-03	5.7E-08	2.8E-08	3.8E-06
PEC freshwater sediment (mg/kg ww)	1.2E-01	4.4E-03	6.6E-01	8.8E-01	2.3E-01	9.5E-05	9.0E-05	6.6E-04
C freshwater sediment (mg/kg ww)	1.2E-01	4.3E-03	6.6E-01	8.8E-01	2.3E-01	9.6E-06	4.8E-06	5.7E-04
PEC marine sediment (mg/kg ww)	4.7E-02	4.4E-04	6.6E-02	8.8E-02	2.3E-02	9.6E-07	4.8E-07	6.6E-05
C marine sediment (mg/kg ww)	4.7E-02	4.4E-04	6.6E-02	8.8E-02	2.3E-02	4.9E-07	6.2E-09	6.5E-05
PEC agricultural soil (mg/kg ww)	1.8E-03	3.0E-06	5.8E-05	3.6E-04	4.4E-04	4.0E-06	4.7E-06	3.3E-06
C agricultural soil (mg/kg ww)	1.8E-03	2.3E-07	5.5E-05	3.6E-04	4.4E-04	1.3E-06	2.0E-06	5.5E-07



PEC groundwater (mg/L)	2.1E-04	2.8E-08	7.3E-06	4.4E-05	5.3E-05	5.3E-08	2.7E-08	6.5E-08
C groundwater (mg/L)	3.3E-07	2.5E-08	3.4E-07	3.3E-07	3.3E-07	3.7E-08	1.5E-08	5.5E-08
PEC oral freshwater fish (mg/kg ww)	2.2E-01	5.9E-04	1.3E+00	1.7E+00	4.5E-01	5.9E-04	5.8E-04	1.3E-04
PEC oral marine top predator (mg/kg ww)	4.9E-02	1.2E-04	2.7E-01	3.6E-01	9.7E-02	6.0E-05	5.8E-05	1.4E-05
PEC oral worm (mg/kg ww)	2.1E-03	3.5E-06	7.6E-05	4.4E-04	5.3E-04	3.4E-06	1.2E-06	3.9E-06
Indirect Human Exposure								
PEC fish (mg/kg ww)	4.4E-01	2.3E-03	2.5E+00	3.3E+00	8.8E-01	1.2E-03	1.2E-03	1.3E-03
C fish (mg/kg ww)	4.4E-01	1.1E-03	2.5E+00	3.3E+00	8.8E-01	4.4E-05	2.2E-05	1.7E-04
PEC drinking water (mg/L)	3.2E-03	7.5E-06	1.7E-02	2.2E-02	6.0E-03	7.7E-06	7.6E-06	8.6E-06
C drinking water (mg/L)	3.2E-03	4.2E-08	1.7E-02	2.2E-02	6.0E-03	3.0E-07	1.5E-07	1.2E-06
PEC meat (mg/kg ww)	5.5E-03	6.8E-06	1.9E-04	1.1E-03	1.4E-03	6.0E-06	6.0E-06	7.7E-06
C meat (mg/kg ww)	5.5E-03	7.2E-07	1.8E-04	1.1E-03	1.4E-03	1.6E-09	8.1E-10	1.7E-06
PEC milk (mg/kg ww)	1.7E-03	2.1E-06	6.1E-05	3.6E-04	4.4E-04	1.9E-06	1.9E-06	2.5E-06
C milk (mg/kg ww)	1.7E-03	2.3E-07	5.9E-05	3.6E-04	4.4E-04	5.4E-10	2.7E-10	5.4E-07
PEC leaf (mg/kg ww)	1.0E-02	4.0E-06	3.6E-04	2.1E-03	2.5E-03	2.7E-06	2.7E-06	3.1E-06
C leaf (mg/kg ww)	1.0E-02	1.3E-06	3.5E-04	2.1E-03	2.5E-03	3.1E-09	1.5E-09	3.7E-07
PEC root (mg/kg ww)	3.6E-03	6.8E-06	1.2E-04	7.3E-04	9.0E-04	8.1E-06	7.2E-06	7.5E-06
C root (mg/kg ww)	3.6E-03	4.6E-07	1.1E-04	7.2E-04	8.9E-04	1.7E-06	8.5E-07	1.1E-06
Dose inhalation (ug/kg/d)	3.5E+01	9.5E-03	1.1E+00	7.1E+00	8.9E+00	4.9E-03	4.9E-03	1.1E-02
Dose oral exposure - excluding inhalation (ug/kg/d)	3.5E+00	5.9E-03	4.6E+00	6.1E+00	1.7E+00	3.9E-03	3.9E-03	4.2E-03
Fraction from water pathways	8.4E-02	3.1E-01	8.1E-01	4.6E-01	1.5E-01	4.8E-01	4.8E-01	2.7E-02
Section - Risk Characterisation	10.1	10.3	10.2	10.4	10.6	10.7	10.8	10.5
PNEC oral (mg/kg ww)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
DNEL inhalation (ug/kg/d)	4.7E-01	4.7E-01	4.7E-01	4.7E-01	4.7E-01	4.7E-01	4.7E-01	4.7E-01
DNEL oral exposure (ug/kg/d)	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01



Environmental Risk								
RCR effluent	9.1E-02	8.5E-04	1.3E-01	1.7E-01	4.6E-02	1.9E-06	9.4E-07	1.3E-04
RCR freshwater	3.5E-02	1.3E-03	2.0E-01	2.6E-01	7.0E-02	7.9E-05	7.7E-05	2.0E-04
RCR marine	1.4E-02	1.3E-04	2.0E-02	2.6E-02	7.0E-03	8.4E-07	6.9E-07	2.0E-05
RCR freshwater sediment	4.0E-02	1.5E-03	2.2E-01	3.0E-01	8.0E-02	3.1E-05	3.0E-05	2.2E-04
RCR marine sediment	1.6E-02	1.5E-04	2.2E-02	3.0E-02	8.0E-03	3.3E-07	1.6E-07	2.2E-05
RCR oral freshwater fish	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RCR oral marine top predator	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RCR agricultural soil	1.8E-03	6.0E-07	5.2E-05	3.6E-04	4.5E-04	3.3E-06	2.0E-06	9.2E-07
RCR worm oral	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Indirect Human Risk								
RCR inhalation	7.5E-01	2.0E-04	2.3E-02	1.5E-01	1.9E-01	1.0E-02	1.0E-02	2.3E-04
RCR ingestion (w/o inhalation)	1.5E-01	2.5E-04	1.9E-01	2.6E-01	7.2E-02	1.7E-02	1.7E-02	1.8E-04
RCR combined HI	9.0E-01	4.5E-04	2.2E-01	4.1E-01	2.6E-01	2.7E-02	2.7E-02	4.1E-04
Max RCR- Water-related compartments	9.1E-02	1.5E-03	2.2E-01	3.0E-01	8.0E-02	7.9E-05	7.7E-05	2.2E-04
Max RCR - all compartments	9.0E-01	1.5E-03	2.2E-01	4.1E-01	2.6E-01	2.7E-02	2.7E-02	4.1E-04

Indirect exposure of man via the environment has been amended to reflect that these streams only contain a maximum of 1% benzene.

Table 2.2: Regional CSR Worksheet

Compartment	Value
Emissions	
Aquatic with STP (kg/d)	1.2E+02
Air (direct + STP) (kg/d)	9.5E+02
Soil (direct only) (kg/d)	1.4E+02
Environmental Exposure	
PEC air (mg/m ³)	1.7E-05
PEC regional, FW (mg/L)	1.5E-05
PEC regional, Fwsediment (mg/kg ww)	8.6E-05
PEC regional, Marine (mg/L)	7.2E-08
PEC regional, msd (mg/kg ww)	4.8E-07
PEC regional, Agsoil (mg/kg ww)	2.7E-06
PEC grassland (Natural) (mg/kg ww)	4.3E-07
Indirect Human Exposure	
PEC fish (mg/kg ww)	1.2E-03
PEC drinking water (mg/kg ww)	7.4E-06
PEC root (mg/kg ww)	6.4E-06
PEC leaf (mg/kg ww)	2.7E-06
PEC meat (mg/kg ww)	6.0E-06
PEC milk (mg/kg ww)	1.9E-06
Dose inhalation (ug/kg/d)	4.9E-03
Dose oral exposure - excluding inhalation (ug/kg/d)	3.8E-03
Environmental Risk Characterisation	
RCR freshwater	7.6E-05
RCR freshwater sediment	2.8E-05
RCR marine	5.5E-07
RCR marine sediment	1.6E-07
RCR agricultural soil	3.7E-07
RCR grassland (Natural)	5.7E-08
Indirect Human Risk	
RCR inhalation	1.0E-02
RCR oral exposure - excluding inhalation	1.6E-02
combined RCR	2.7E-02