



SAFETY DATA SHEET

For Gas oils (petroleum), heavy vacuum

Version No	4.0
Last Updated	2 Jan 2013
Supersedes	3.0

To Wim Tavernier
 From HESS ENERGY TRADING
 COMPANY (UK) LTD

Unique Reference No.

Date 8 Dec 2014 11:10

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE

1.1 Product identifier

CAS	64741-57-7 : EC No. 265-058-3 : EC Index 649-009-00-7	Substance	Gas oils (petroleum), heavy vacuum
Commercial Product Name	Gasoil	Synonyms	

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

Exposure Scenario(s)	Gasoil 64741-57-7 English	Chemical Safety Report	Not Applicable
Specific Use(s)			
Uses Advised Against			

1.3 Details of the supplier of the SDS

Company	HESS ENERGY TRADING COMPANY (UK) LTD 33 Grosvenor Place London SW1X 7HY UNITED KINGDOM	Telephone No.	+44 (0) 2072017132
		Email	Londonops@hetco.com
		Fax	

1.4 Emergency telephone number

Emergency telephone number	+32 3 575 11 30 (SGS Emergency Hotline)	Anti-Poisoning Centre Number
Opening Hours	Available 24/7/365	

NOTWITHSTANDING ANY OTHER PROVISIONS OF THIS SDS, THIS SDS IS NOT INTENDED TO, AND DOES NOT, COMPLY WITH EU REGULATION (EC) 1907/2006 (AS AMENDED FROM TIME TO TIME)

	SAFETY DATA SHEET	Page : 2 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EU) 1272/2008

CLP-Classification : The product is classified as hazardous in accordance with Regulation (EC) No. 1272/2008.

Asp. Tox. 1	H304
Acute Tox. 4 (Inhalation)	H332
Carc. 1B	H350
Repr. 2	H361d
STOT RE 2	H373
Aquatic Chronic 1	H410
Aquatic Acute 1	H400

Full text of H-phrases: see section 16

2.1.2. Classification according to EU Directives 67/548/EC or 1999/45/EC

Classification : The product is classified as dangerous in accordance with Directive 67/548/EEC.

Xn; R20
Xn; R48/21
Repr.Cat.3; R63
R66
N; R50/53
Carc.Cat.2; R45

Full text of R-phrases: see section 16

2.2. Label elements

2.2.1. Labelling according to Regulation (EU) 1272/2008

CLP pictograms :



GHS07

GHS08

GHS09

Signal word :

Danger

Hazard statements (CLP) :

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

Precautionary statements (CLP) :

P201 - Obtain special instructions before use.
P260 - Do not breathe vapour.
P273 - Avoid release to the environment.
P281 - Use personal protective equipment as required.
P501 - Dispose of contents/ container to an approved waste disposal plant.
P308+P313 - IF exposed or concerned: Get medical advice/ attention.
EUH066 - Repeated exposure may cause skin dryness or cracking.
Restricted to professional users.

Extra phrases :

2.2.2. Labelling according to Directives (67/548 - 1999/45)

Not relevant

	SAFETY DATA SHEET	Page : 3 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

2.3. Other hazards

Other hazards which do not result in classification : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name	Product identifier	%	Classification according to Directive 67/548/EEC
Gas oils (petroleum), heavy vacuum	(CAS No.) 64741-57-7 (EC No) 265-058-3 (EC Index) 649-009-00-7	100	Repr.Cat.3; R63 Carc.Cat.2; R45 Xn; R48/21 Xn; R20 R66 N; R50/53
Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Gas oils (petroleum), heavy vacuum	(CAS No.) 64741-57-7 (EC No) 265-058-3 (EC Index) 649-009-00-7	100	Asp. Tox. 1, H304 Acute Tox. 4 (Inhalation), H332 Repr. 2, H361d Carc. 1B, H350 STOT RE 2, H373 Aquatic Chronic 1, H410 Aquatic Acute 1, H400

Full text of R-, H- and EUH-phrases: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation : Keep at rest.
Move to fresh air.
In case of shortness of breath, give oxygen.
If not breathing, give artificial respiration.
Consult a physician if necessary.

Skin contact : Take off contaminated clothing and shoes immediately.
After contact with skin, wash immediately with plenty of water and soap.
If skin irritation persists, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

Ingestion : Do NOT induce vomiting.
Rinse mouth.
Drink plenty of water.
Obtain medical attention.

Additional advice : First aider needs to protect himself.
See also section 8
Never give anything by mouth to an unconscious person or a person with cramps.
Show this safety data sheet to the doctor in attendance.
Treat symptomatically.
When symptoms persist or in all cases of doubt seek medical advice.
Burns must be treated by a physician.

	SAFETY DATA SHEET	Page : 4 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

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

Inhalation	: Harmful if inhaled. May cause irritation of respiratory tract.
Skin contact	: Harmful: danger of serious damage to health by prolonged exposure in contact with skin. Repeated exposure may cause skin dryness or cracking. Contact with hot product will cause thermal burns.
Eye contact	: Contact with eyes may cause irritation. Swelling of tissue, blurred vision . Contact with hot product will cause thermal burns.
Ingestion	: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Other adverse effects	: Carcinogenic Suspected of damaging the unborn child.

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

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Dry sand, Carbon dioxide (CO2), Dry chemical, powdered form, Water spray .
Extinguishing media which shall not be used for safety reasons	: High volume water jet

5.2. Special hazards arising from the substance or mixture

Fire hazard	: Combustible material
Specific hazards	: The pressure in sealed containers can increase under the influence of heat. Vapours may form explosive mixture with air. Burning produces noxious and toxic fumes. Possible decomposition products are: COx, SOx, H2S, H2SO4 Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

5.3. Advice for firefighters

Advice for firefighters	: Special protective equipment for firefighters . In the event of fire, wear self-contained breathing apparatus. In the event of fire, cool tanks with water spray. Evacuate personnel to safe areas. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
-------------------------	--

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel	: Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Wear personal protective equipment. See also section 8. Avoid contact with skin and eyes. Do not breathe vapours or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Ensure all equipment is electrically grounded before beginning transfer operations. Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.
Advice for emergency responders	: Only qualified personnel equipped with suitable protective equipment may

	SAFETY DATA SHEET	Page : 5 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

intervene.
See also section 8.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Prevent further leakage or spillage if safe to do so.
Dam up.
Soak up with inert absorbent material.
Sweep up and shovel into suitable containers for disposal.
Large spills should be collected mechanically (remove by pumping) for disposal.
Dispose of as special waste in compliance with local and national regulations.
Local authorities should be advised if significant spillages cannot be contained.

6.4. Reference to other sections

See also section 8
See also section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling : Provide adequate information, instruction and training for operators.
Ensure adequate ventilation.
Wear personal protective equipment.
See also section 8
Avoid contact with skin, eyes and clothing.
Do not breathe vapours or spray mist.
Ensure all equipment is electrically grounded before beginning transfer operations.
Keep away from heat and sources of ignition.
Keep away from flames and sparks.
Take care to avoid waste and spillage when weighing, loading and mixing the product.
Do not let product enter drains.
Take any precaution to avoid mixing with incompatible materials.
See also section 10.
Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Wash hands before breaks and immediately after handling the product.
When using, do not eat, drink or smoke.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.
Keep away from food, drink and animal feeding stuffs.

7.2. Conditions for safe storage, including any incompatibilities

Storage : Keep tightly closed in a dry, cool and well-ventilated place.
Do not store near or with any of the incompatible materials listed in section 10.
Keep away from open flames, hot surfaces and sources of ignition.
Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank

	SAFETY DATA SHEET	Page : 6 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

Packaging material : headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

: Store in original container.

7.3 Specific end use(s)

see attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limit(s) : No data available

CAS 64741-57-7 (64741-57-7)	
DNEL/DMEL (workers)	
Acute - systemic effects, inhalation	4700 mg/m ³
Long-term - systemic effects, dermal	0,065 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	0,12 mg/m ³
DNEL/DMEL (general population)	
Long-term - systemic effects, oral	0,015 mg/kg bodyweight/day
PNEC (Oral)	
PNEC oral (secondary poisoning)	66,7 kg/kg

8.2. Exposure controls

Personal protective equipment : The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.
Recommended Filter type: (A - EN 141)
Respirator with a half face mask (EN 140)
Respirator with a full face mask (EN 136)
Self-contained open-circuit compressed air breathing apparatus (EN 137)

Hand protection : Nitrile rubber (EN 374) The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves.

Eye protection : Safety glasses (EN 166)

Skin and body protection : Chemical-resistant overalls

Thermal hazard protection : Use dedicated equipment.

Engineering measures : Use product only in closed system.
Use only in area provided with appropriate exhaust ventilation.
Ensure adequate ventilation.
Ensure that eyewash stations and safety showers are close to the workstation location.
Organisational measures to prevent /limit releases, dispersion and exposure
Take precautionary measures against static discharges.
See also section 7

Environmental exposure controls : Do not flush into surface water or sanitary sewer system.
Comply with applicable Community environmental protection legislation.

	SAFETY DATA SHEET	Page : 7 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	: viscous liquid
Colour	: no data available
Odour	: characteristic
Odour threshold (mg/m ³)	: No data available
Odour threshold (ppm)	: No data available
pH	: Not applicable
Melting point/range	: < 30 °C
Boiling point/boiling range	: 150 - > 750 °C
Flash point	: > 60 °C
Evaporation rate	: No data available
Flammability (solid, gas)	: Not applicable, liquid
Explosion limits	: No data available
Vapour pressure	: 0.02 - 0.791 kPa (120°C) 0.063 - 0.861 kPa (150°C)
Vapour density	: No data available
Density	: 840 - 1200 kg/m ³ (@ 15°C)
Relative density	: No data available
Water solubility	: No data available
Solubility in other solvents	: No data available
Partition coefficient: n-octanol/water	: No data available
Autoignition temperature	: 220 - 550 °C
Viscosity	: >= 3 mm ² /s (@ 100°C)
Explosive properties	: Not applicable The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.
Oxidizing properties	: Not applicable The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: See also section 10.5
------------	-------------------------

10.2. Chemical stability

Stability	: Stable under normal conditions.
-----------	-----------------------------------

10.3. Possibility of hazardous reactions

Hazardous reactions	: None under normal processing.
---------------------	---------------------------------

10.4. Conditions to avoid

Conditions to avoid	: Keep away from heat and sources of ignition. See also section 7 Handling and storage
---------------------	--

	SAFETY DATA SHEET	Page : 8 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

10.5. Incompatible materials

Incompatible materials : Incompatible with strong acids and oxidizing agents. Bases . See also section 7 Handling and storage

10.6. Hazardous decomposition products

Hazardous decomposition products : Burning produces noxious and toxic fumes. Carbon oxides, Sulphur oxides, Sulphuric acid, hydrogen sulphide (H₂S).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Harmful if inhaled.

CAS 64741-57-7 (64741-57-7)	
LD50/oral/rat	2000 mg/kg
LD50/dermal/rabbit	2000 mg/kg
LC50/inhalation/4h/rat	4100- 4500 mg/m ³

Gas oils (petroleum), heavy vacuum (64741-57-7)	
LD50/oral/rat	4320 mg/kg
LD50/dermal/rat	> 2000 mg/kg
LD50/dermal/rabbit	> 2000 mg/kg
LC50/inhalation/4h/rat	4100 - 4500 mg/m ³

Skin corrosion/irritation : Not classified (Based on available data, the classification criteria are not met.)
pH: Not applicable

Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met.)
pH: Not applicable

Respiratory/skin sensitisation : Not classified (Based on available data, the classification criteria are not met.)

Germ cell mutagenicity : Not classified (Based on available data, the classification criteria are not met.)

Carcinogenicity : May cause cancer.

Reproductive toxicity : Suspected of damaging the unborn child.
NOAEL = 125 - 2000 mg/kg BW/d

Specific target organ toxicity (single exposure) : Not classified (Based on available data, the classification criteria are not met.)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.
NOAEL = > 1 mg/kg BW/d

Aspiration hazard : May be fatal if swallowed and enters airways.

Further information

Symptoms related to the physical, chemical and toxicological characteristics, See section 4.2.

SECTION 12: Ecological information

12.1. Toxicity

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

	SAFETY DATA SHEET	Page : 9 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

CAS 64741-57-7 (64741-57-7)	
Additional information	Acute aquatic toxicity, Invertebrates.: EL50 = 2 mg/l Acute (short-term) algae toxicity, ErL50 = 0,75 mg/l: Acute (short-term) fish toxicity, LL50: 79 mg/l Chronic (long-term) fish toxicity, NOEL: 0.1 mg/l Long term effects, Invertebrates., NOEL: 0,75 mg/l Bird reproduction toxicity, NOAEL: 20000 mg/l

Gas oils (petroleum), heavy vacuum (64741-57-7)	
LC50/96h/fish	48 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [semi-static])

12.2. Persistence and degradability

Persistence and degradability : Substance is complex UVCB
Not applicable

12.3. Bioaccumulative potential

Bioaccumulation : Substance is complex UVCB
Not applicable

Partition coefficient: n-octanol/water : No data available

12.4. Mobility in soil

Mobility : No data available

12.5. Results of PBT and vPvB assessment

PBT/vPvB : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

12.6. Other adverse effects

Further information : No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues / unused products : Handle with care.
See also section 7
Handling and storage
Where possible recycling is preferred to disposal or incineration.
Collect and dispose of waste product at an authorised disposal facility.
Dispose of in accordance with local regulations.

Contaminated packaging : Do not use pressure to empty drums.
Do not burn, or use a cutting torch on, the empty drum.
Do not puncture or incinerate.
Empty containers should be transported/delivered using a registered waste carrier to local recyclers for disposal.
Dispose of in accordance with local regulations.

Additional ecological information : Do not flush into surface water or sanitary sewer system.

Waste codes / waste designations according to EWC : Classified as hazardous waste according to European Union regulations.
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
The following Waste Codes are only suggestions:
130701 - fuel oil and diesel
150110 - packaging containing residues of or contaminated by dangerous substances

	SAFETY DATA SHEET	Page : 10 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

SECTION 14: Transport information

14.1. UN number

UN-No. : 3082

14.2. UN proper shipping name

Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(Residues (petroleum), hydrocracked ())

Proper shipping name IATA/IMDG : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Residues (petroleum), hydrocracked ())

14.3. Transport hazard class(es)

14.3.1. Overland transport

Class : 9 - Miscellaneous dangerous substances and articles

Hazard identification number (Kemler No.) : 90

Classification code (ADR) : M6

ADR/RID-Labels : 9 - Miscellaneous dangerous substances and articles



14.3.2. Inland waterway transport (ADN)

ADN : Hazards : 9 + N1+CMR

Class (ADN) : 9

14.3.3. Transport by sea

Class : 9 - Miscellaneous dangerous substances and articles

14.3.4. Air transport

Class : 9 - Miscellaneous dangerous substances and articles

14.4. Packing group

Packing group : III

14.5. Environmental hazards

Environmental hazards : P



Other information : ADN : N1.

14.6 Special precautions for user

No data available

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

No data available

	SAFETY DATA SHEET	Page : 11 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

Restrictions on use :

3. Liquid substances or mixtures, which are regarded as dangerous according to the definitions in Council Directive 67/548/EEC and Directive 1999/45/EC.

: CAS 64741-57-7

28. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Carcinogen category 1A or 1B (Table 3.1) or Carcinogen category 1 or 2 (Table 3.2) and listed as follows: Carcinogen category 1A (Table 3.1)/Carcinogen category 1 (Table 3.2) listed in Appendix 1 Carcinogen category 1B (Table 3.1)/Carcinogen category 2 (Table 3.2) listed in Appendix 2

: CAS 64741-57-7 - Gas oils (petroleum), heavy vacuum

This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC.

: None

Authorisations

: Not applicable

Take note of Directive 92/85/EEC on the safety and health at work of pregnant workers.

Take note of Directive 94/33/EC on the protection of young people at work.

15.1.2. National regulations

DE: WGK

: 3

DE: TA-Luft

: Carcinogenic substances

DE: Technische Regeln für Gefahrstoffe (TRGS)

: applicable

FR: Installations classées

: 117X

NL: ABM

: 3 - May cause cancer. (A)

NL: NeR (Nederlandse emissie Richtlijn)

: Organic substances in vapour or gaseous form

15.2. Chemical safety assessment

Chemical Safety Assessment

: A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of R-, H- and EUH-phrases:

Acute Tox. 4 (Inhalation)	: Acute toxicity (inhalation) Category 4
Aquatic Acute 1	: Hazardous to the aquatic environment - Aquatic Acute 1
Aquatic Chronic 1	: Hazardous to the aquatic environment - chronic hazard category 1
Asp. Tox. 1	: Aspiration hazard Category 1
Carc. 1B	: Carcinogenicity Category 1B
Repr. 2	: Reproductive toxicity, Hazard Category 2
STOT RE 2	: Specific target organ toxicity (repeated exposure) Category 2
H304	: May be fatal if swallowed and enters airways.
H332	: Harmful if inhaled.
H350	: May cause cancer.
H361d	: Suspected of damaging the unborn child
H373	: May cause damage to organs through prolonged or repeated exposure.
H400	: Very toxic to aquatic life.

	SAFETY DATA SHEET	Page : 12 / 11
		SGS Revision nr : 5
	CAS 64741-57-7	Issuing date : 28/12/2012
		Supersedes : 23/12/2010

H410	: Very toxic to aquatic life with long lasting effects.
R20	: Harmful by inhalation.
R45	: May cause cancer.
R48/21	: Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
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.
R66	: Repeated exposure may cause skin dryness or cracking.
N	: Dangerous for the environment
Xn	: Harmful
Sources of key data used to compile the Safety Data Sheet	: European Chemicals Bureau CSR
Safety datasheet sections which have been updated:	: 2,4,5,6,7,8,9,10,11,12,13,14,15,16
Abbreviations and acronyms	: ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC IATA = International Air Transport Association IMDG = International Maritime Dangerous Goods Code LEL = Lower Explosive Limit/Lower Explosion Limit UEL = Upper Explosion Limit/Upper Explosive Limit REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals vPvB = very persistent and very bioaccumulating PBT = persistent, bioaccumulating and toxic (PBT). STEL = Short term exposure limit TWA = time weighted average TLV = Threshold limits WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act) DNEL = Derived No Effect Level PNEC = Predicted No Effect Concentration LD50 = Median lethal dose LC50 = Median lethal concentration NOAEL = No observed adverse effect level Substance of unknown or variable composition, complex reaction products or biological material (UVCB) ATE = Acute toxicity estimate

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

SUMMARY OF CHANGES

For 64741-57-7

The following changes have been made to this eSDS:

Version 3.0 updated to Version 4.0 - 2 Jan 2013

- Sections 2-16 updated

Version 2.0 updated to Version 3.0 - 1 Jan 2011

- Sections 2-16 updated

Version 1.0 updated to Version 2.0 - 30 Nov 2010

- Sections 2-16 updated

Version - updated to Version 1.0 - 24 Jun 2009

- Sections 2-16 updated

Gas oils (petroleum), heavy vacuum

CAS Number 64741-57-7
EC Number 265-058-3
SDS Reference

Summary of Parameters

Physical parameters			
Vapor Pressure (Pa)		20 – 791 at 120 °C Value used for exposure assessment = 1.5	
Partition Co-efficient (log K _{OW})		Range between 2.92 and 20.43	
Aqueous solubility (mg L ⁻¹)		Range between 5.1E-18 and 2.3E+02 Value used for environmental exposure assessment = 0.93	
Molecular weight		Not applicable	
Human health parameters (DNELs)			
Worker	Short-term	Inhalation (mg m ⁻³)	4700
		Dermal (mg kg ⁻¹ bw day ⁻¹)	n/a
	Long-term	Inhalation (mg m ⁻³)	0.12
		Dermal (mg kg ⁻¹ bw day ⁻¹)	0.065
Consumer		Inhalation (mg m ⁻³)	n/a
		Dermal (mg kg ⁻¹ bw day ⁻¹)	n/a
		Oral (mg kg ⁻¹ bw day ⁻¹)	0.015
Environmental Parameters (PNECs)			
GAS OILS (PETROLEUM), HEAVY VACUUM is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PNEC is not available for GAS OILS (PETROLEUM), HEAVY VACUUM for individual environmental compartments.			

Table of Contents

ES1	Distribution of GAS OILS (PETROLEUM), HEAVY VACUUM
ES2	Formulation and (re)packing of GAS OILS (PETROLEUM), HEAVY VACUUM
ES3	Use of Fuels, diesel as a GAS OILS (PETROLEUM), HEAVY VACUUM
ES4	Use of Fuels, diesel as a GAS OILS (PETROLEUM), HEAVY VACUUM

Definition of Contributing Scenarios

Contributing Scenario	Definition
PROC1	Use in closed process, no likelihood of exposure.
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC2 (storage)	Use in closed, continuous process with occasional controlled exposure. Bulk storage.
PROC2 (sampling)	Use in closed, continuous process with occasional controlled exposure. Sample collection at ventilated sample points
PROC2 (fuel filtering)	Use in closed, continuous process with occasional controlled exposure. In-line filter or centrifuge.
PROC3	Use in closed, continuous process with occasional exposure
PROC8a (manual)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. Manual transfer/pouring from containers
PROC8a (maintenance)	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Clean down and maintenance of vessels and containers.
PROC8b (bulk)	Transfer of substance or preparation (charge/discharge) from/to vessels/large containers at dedicated facilities Bulk transfer in a closed system (e.g. bottom loading)
PROC8b (marine)	Transfer of substance or preparation (charge/discharge) from/to vessels/large containers at dedicated facilities. Marine vessel or barge loading
PROC8b (road and rail)	Transfer of substance or preparation (charge/discharge) from/to vessels/large containers at dedicated facilities. Road tanker or railcar loading
PROC8b (drum)	Transfer of substance or preparation (charge/discharge) from/to vessels/large containers at dedicated facilities. Drum or batch transfers.
PROC8b (refueling)	Transfer of substance or preparation (charge/discharge) from/to vessels/large containers at dedicated facilities. Refueling residences, heavy equipment
PROC15	Use as a laboratory reagent
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

ES1 – Distribution of GAS OILS (PETROLEUM), HEAVY VACUUM

1.0 Description of Contributing Scenarios

Sector of Use	SU3 - Industrial uses
Process Category	PROC1 PROC2 PROC2 (storage) PROC2 (sampling) PROC3 PROC8a (maintenance) PROC8b (marine) PROC8b (road and rail) PROC15
Product Category	n/a
Article Category	n/a
Environmental Release Category	ERC1 - Manufacture of substances ERC2 - Formulation of preparations ERC3 - Formulation in materials ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles ERC5 – Industrial use resulting in inclusion into or onto a matrix ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b - Industrial use of reactive processing aids ERC6c - Industrial use of monomers for manufacture of thermoplastics ERC6d - Industrial use of process regulators for polymerisation processes in production of resins, rubbers and polymers ERC7 - Industrial use of substances in closed systems
Specific Environmental Release Category	ESVOC SpERC 1.1b v.1

2.0 Operation conditions and risk management measures

2.1 Control of Worker exposure

Product Characteristics

Physical Form	Liquid
Concentration of substance	Up to 100%

Human factors not influenced by risk management

Potentially exposed body parts	Not defined
--------------------------------	-------------

Frequency and Duration of Use

Exposure duration (hours per day)	PROC1, PROC8a (maintenance), PROC15,	Up 8 hours
	PROC2 (storage), PROC3, PROC8b (marine)	Up to 4 hours
	PROC8b (road and rail)	Up to 1 hour
	PROC2, PROC2 (sampling)	Up to 15 minutes
Frequency of Use (days per year)	300	

Operational conditions affecting worker exposure

Location of use (Indoor/outdoor)	PROC1, PROC2	outdoor (equivalent to 30 % ventilation effectiveness)
	All other contributing scenarios	Not defined (default = indoor)
Location characteristics	Not defined	
Assumes uses at not > 20 °C above ambient, unless stated differently Assumes a good basic standard of occupational hygiene is implemented Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical protective measures		
PROC2 (sampling),	Sample via a closed loop or other system intended to avoid exposure	
PROC1, PROC2, PROC2 (storage)	Use in a closed system	
PROC15	Use in a fume cupboard (90 % effectiveness)	
Organizational Measures to minimize worker exposure		
PROC8b (marine)	Transfer via enclosed lines. Clear transfer lines prior to de-coupling. Retains drain downs in sealed storage pending disposal or subsequent recycle	
PROC8a (maintenance)	Drain down and flush system prior to equipment break-in or maintenance. Retains drain downs in sealed storage pending disposal or subsequent recycle (equivalent to 75 % dermal effectiveness)	
PROC8b (road and rail)	If exposure exceeds one hour, ensure material transfers are under containment or extract ventilation	
Risk Management Measures required to minimize worker exposure in the described scenario		
Respiratory protection	No specific measures identified	
Hand and Skin Protection	PROC15	Wear suitable gloves tested to EN374 (80 % effectiveness)
	PROC1, PROC2, PROC2 (storage), PROC3, PROC8b (marine),	Wear chemically resistant gloves tested to EN374 (in combination with 'basic' employee training (90 % effectiveness)
	PROC8a (maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training
Eye protection	No specific measures identified	
Other measures recommended to further reduce worker exposure		
Use long handled tools where possible (PROC8a (maintenance)) Decontaminate tools, equipment and PPE items in a segregated area (PROC8a (maintenance))		
2.2 Control of Environmental Exposure		
Quantities Used		
Fraction of total tonnage used regionally	0.1	
Regional annual tonnage (tonnes year ⁻¹)	1.1E+07	
Fraction of regional tonnage used locally	2.0E-03	
Annual site tonnage (tonnes year ⁻¹)	2.3E+04	
Average daily usage (kg day ⁻¹)	7.7E+04	
Environmental Factors not affected by risk management		

Flow rate of receiving surface water (m ³ day ⁻¹)		Not defined (default = 18,000)
Dilution factor	Freshwater	10
	Marine water	100
Operational conditions recommended to minimize environmental exposure		
Number of emission days per year		300
Release fraction before RMM	Air	1.0E-04
	Waste water	1.0E-07
	Soil	1.0E-05
Efficiency of technical measures used to reduce emission to named environmental compartment		
Air (%)		90
Waste water (%)		0
Soil (%)		0
Technical measures to achieve reduced emissions		Common practices vary across sites, thus conservative process release estimates used.
Organizational measures to limit release from site		
Do not apply industrial sludge to natural soils		
Sludge should be incinerated, contained or reclaimed		
Conditions and measures related to municipal sewage treatment plant		
Size (m ³ day ⁻¹)		2000
Degradation efficiency (%)		88.8
Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations		
Substance release quantities after risk management measures		
Typical release to water (mg l ⁻¹)		Not defined
Maximum allowable site tonnage based on wastewater treatment, M _{safe} (kg day ⁻¹)		3.8E+05

3.0 Exposure estimation and reference to its source

Predicted workers exposure

Tool used to calculate exposure	ECETOC TRA
---------------------------------	------------

Process Category	Inhalation		Dermal		Combined
	Exposure (ppm)	RCR	Exposure (mg kg ⁻¹ day ⁻¹)	RCR	RCR
PROC1	0.01	0.06	0.03	0.57	0.63
PROC2	0.04	0.29	0.03	0.57	0.86
PROC2 (storage)	0.04	0.32	0.03	0.57	0.89
PROC2 (sampling)	0.04	0.29	0.03	0.57	0.86
PROC3	0.04	0.32	0.03	0.57	0.89
PROC8a (maintenance)	0.00	0.02	0.05	0.83	0.85
PROC8b (marine)	0.04	0.32	0.03	0.57	0.89
PROC8b (roadandrail)	0.03	0.28	0.03	0.57	0.85
PROC15	0.05	0.42	0.01	0.10	0.52

Predicted environmental exposure

Tool used to calculate exposure	Petrorisk model using Hydrocarbon Block Method
GAS OILS (PETROLEUM), HEAVY VACUUM is a hydrocarbon UVCB. The hydrocarbon block	

method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PEC is not available for GAS OILS (PETROLEUM), HEAVY VACUUM for individual environmental compartments.

Exposure	STP	Freshwater	Marine water	Soil	Sediment freshwater	Sediment marine
RCR	1.3E-01	3.1E-02	2.8E-04	3.5E-04	4.0E-02	8.4E-04

Total Human Exposure due to the Environment:

Route of Exposure	Exposure ($\mu\text{g kg}^{-1} \text{ day}^{-1}$)	RCR
Oral	3.4	1.7E-01
Inhalation	0.58	2.9E-02

4.0 Guidance to Downstream Users

Scaling	Where other Risk Management Measures or Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)	
Exposure Tool used	Worker	EcetocTRA
	Environmental	PETRORISK (using hydrocarbon block model)

ES2 – Formulation and (re)packing of GAS OILS (PETROLEUM), HEAVY VACUUM

1.0 Description of Contributing Scenarios

Sector of Use	SU3 - Industrial uses SU10 - Formulation (mixing) of preparations and/or re-packing
Process Category	PROC1 PROC2 PROC2 (storage) PROC2 (sampling) PROC3 PROC8a (maintenance) PROC8b (marine) PROC8b (road and rail) PROC8b (drum) PROC15
Product Category	n/a
Article Category	n/a
Environmental Release Category	ERC2 - Formulation of preparations
Specific Environmental Release Category	ESVOC SpERC 2.2 v.1

2.0 Operation conditions and risk management measures

2.1 Control of Worker exposure

Product Characteristics

Physical Form	Liquid
Concentration of substance	Up to 100 %

Human factors not influenced by risk management

Potentially exposed body parts	Not defined
--------------------------------	-------------

Frequency and Duration of Use

Exposure duration (hours per day)	PROC1, PROC8a (maintenance), PROC15	Up to 8 hours
	PROC2 (storage), PROC3, PROC8b (marine)	1 – 4 hours
	PROC8b (road and rail), PROC8b (drum)	Up to 1 hour
	PROC2, PROC2 (sampling)	Up to 15 minutes
Frequency of Use (days per year)	300	

Operational conditions affecting worker exposure

Location of use (Indoor/outdoor)	PROC1, PROC2, PROC2 (sampling), PROC8b (drum)	Outdoor (equivalent to 30 % ventilation effectiveness)
	All other contributing scenarios	Not defined (default = indoor)
Location characteristics	Not defined	

Assumes uses at not > 20 °C above ambient, unless stated differently
 Assumes a good basic standard of occupational hygiene is implemented
 Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and

suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical protective measures		
PROC1, PROC2, PROC2 (sampling), PROC3	Use in a closed system.	
PROC2, PROC2 (sampling), PROC3	Sample via a closed loop or other system intended to avoid exposure.	
PROC15	Use in a fume cupboard (90 % effectiveness)	
PROC8b (marine)	Transfer via enclosed lines	
PROC8b (road and rail), PROC8b (drum)	Ensure material transfers are under containment or extract ventilation (90 % effectiveness)	
PROC8b (drum)	If process cannot be performed outdoors, provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) (30 % effectiveness)	
Organizational Measures to minimize worker exposure		
PROC8b (marine)	Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance, retain drain downs in sealed storage pending disposal or subsequent recycle	
PROC8b (road and rail)	If exposure exceeds 1 hour per day, ensure material transfers are under containment or extract ventilation.	
PROC8a (maintenance)	Drain down and flush system prior to equipment break-in or maintenance, retain drain downs in sealed storage pending disposal or subsequent recycle	
Risk Management Measures required to minimize worker exposure in the described scenario		
Respiratory protection	No specific measures identified	
Hand and Skin Protection	PROC1, PROC2, PROC2 (storage), PROC2 (sampling), PROC3, PROC8b (marine), PROC8b (road and rail), PROC8b (drum),	Wear chemically resistant gloves tested to EN374 (in combination with 'basic' employee training (90 % effectiveness)
	PROC8a (maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training (95 % effectiveness).
	PROC15	Wear suitable gloves tested to EN374 (80 % effectiveness)
Eye protection	No specific measures identified	
Other measures recommended to further reduce worker exposure		
Use long handled tools where possible (PROC8a (maintenance)) Decontaminate tools, equipment and PPE items in a segregated area (PROC8a (maintenance))		
2.2 Control of Environmental Exposure		
Quantities Used		
Fraction of total tonnage used regionally	0.1	
Regional annual tonnage (tonnes year ⁻¹)	1.1E+07	
Fraction of regional tonnage used locally	2.6E-03	
Annual site tonnage (tonnes year ⁻¹)	3.0E+04	
Average daily usage (kg day ⁻¹)	1.0E+05	

Environmental Factors not affected by risk management		
Flow rate of receiving surface water (m ³ day ⁻¹)		Not defined (default = 18,000)
Dilution factor	Freshwater	10
	Marine water	100
Operational conditions recommended to minimize environmental exposure		
Number of emission days per year		300
Release fraction before RMM	Air	2.2E-03
	Waste water	5.0E-06
	Soil	1.0E-04
Efficiency of technical measures used to reduce emission to named environmental compartment		
Air (%)		0
Waste water (%)		54
Soil (%)		0
Technical measures to achieve reduced emissions		Common practices vary across sites, thus conservative process release estimates used.
Organizational measures to limit release from site		
Do not apply industrial sludge to natural soils		
Sludge should be incinerated, contained or reclaimed		
Conditions and measures related to municipal sewage treatment plant		
Size (m ³ day ⁻¹)		2000
Degradation efficiency (%)		88.8
Conditions and measures related to external treatment of waste for disposal		
External treatment and disposal of waste should comply with applicable local and/or national regulations		
Substance release quantities after risk management measures		
Typical release to water (mg l ⁻¹)		Not defined
Maximum allowable site tonnage based on wastewater treatment, M _{safe} (kg day ⁻¹)		1.1E+05

3.0 Exposure estimation and reference to its source

Predicted workers exposure

Tool used to calculate exposure	ECETOC TRA
---------------------------------	------------

Process Category	Inhalation		Dermal		Combined
	Exposure (ppm)	RCR	Exposure (mg kg ⁻¹ day ⁻¹)	RCR	RCR
PROC1	0.01	0.06	0.03	0.57	0.63
PROC2	0.04	0.29	0.03	0.57	0.86
PROC2 (storage)	0.04	0.32	0.03	0.57	0.89
PROC2 (sampling)	0.04	0.29	0.03	0.57	0.86
PROC3	0.04	0.32	0.03	0.57	0.89
PROC8a (maintenance)	0.00	0.02	0.05	0.83	0.85
PROC8b (marine)	0.04	0.32	0.03	0.57	0.89
PROC8b (road and rail)	0.03	0.28	0.03	0.57	0.85
PROC8b (drum)	0.02	0.19	0.03	0.57	0.74
PROC15	0.05	0.42	0.01	0.10	0.52

Predicted environmental exposure

Tool used to calculate exposure

Petrorisk model using Hydrocarbon Block Method

GAS OILS (PETROLEUM), HEAVY VACUUM is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PEC is not available for GAS OILS (PETROLEUM), HEAVY VACUUM for individual environmental compartments.

Exposure	STP	Freshwater	Marine water	Soil	Sediment freshwater	Sediment marine
RCR	1.3E-01	1.8E-01	1.8E-02	2.3E-03	2.4E-01	2.1E-02

Total Human Exposure due to the Environment:

Route of Exposure	Exposure ($\mu\text{g kg}^{-1} \text{ day}^{-1}$)	RCR
Oral	3.8	1.9E-01
Inhalation	14	7.2E-01

4.0 Guidance to Downstream Users

Scaling	Where other Risk Management Measures or Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)	
Exposure Tool used	Worker	EcetocTRA
	Environmental	PETRORISK (using hydrocarbon block model)

ES3 – Use of GAS OILS (PETROLEUM), HEAVY VACUUM as a Fuel

1.0 Description of Contributing Scenarios

Sector of Use	SU3 - Industrial uses
Process Category	PROC1 PROC2 PROC2 (fuel filtering) PROC2 (storage) PROC3 PROC8a (maintenance) PROC8b (bulk) PROC8b (drum) PROC16
Product Category	n/a
Article Category	n/a
Environmental Release Category	ERC7 - Industrial use of substances in closed systems
Specific Environmental Release Category	ESVOC SpERC 7.12a v.1

2.0 Operation conditions and risk management measures

2.1 Control of Worker exposure

Product Characteristics

Physical Form	Liquid, low volatility
Concentration of substance	Up to 100 %

Human factors not influenced by risk management

Potentially exposed body parts	Not defined
--------------------------------	-------------

Frequency and Duration of Use

Exposure duration (hours per day)	PROC1, PROC8a (maintenance), PROC16	Up to 8 hours
	PROC2 (fuel filtering), PROC2 (storage), PROC3, PROC8b (bulk)	Up to 4 hours
	PROC2, PROC8b (drum)	Up to 1 hour
Frequency of Use (days per year)	300	

Operational conditions affecting worker exposure

Location of use (Indoor/outdoor)	PROC1	Outdoor
	All other contributing scenarios	Not defined (default = indoor)
Location characteristics	Not defined	

Assumes uses at not > 20 °C above ambient, unless stated differently
Assumes a good basic standard of occupational hygiene is implemented
Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance.
Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing

scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical protective measures		
PROC1, PROC2, PROC2 (storage), PROC3	Use in a closed system, sample via a closed loop or other system intended to avoid exposure	
PROC2 (fuel filtering), PROC2 (storage), PROC8b (drum)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) (30 % effectiveness)	
PROC8b (bulk)	Transfer via enclosed lines	
Organizational Measures to minimize worker exposure		
PROC8a (maintenance)	Drain down and flush system prior to equipment break-in or maintenance, retain drain downs in sealed storage pending disposal or subsequent recycle (equivalent to 75 % dermal effectiveness)	
Risk Management Measures required to minimize worker exposure in the described scenario		
Respiratory protection	No specific measures identified	
Hand and Skin Protection	PROC1, PROC2, PROC2 (fuel filtering), PROC2 (storage), PROC3, PROC8b (drum), PROC8b (drum), PROC16	Wear chemically resistant gloves tested to EN374 (in combination with 'basic' employee training (90 % effectiveness)
	PROC8a (maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training (95 % effectiveness)
Eye protection	No specific measures identified	
Other measures recommended to further reduce worker exposure		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) (PROC16) Use long handled tools where possible. Decontaminate tools, equipment and PPE items in a segregated area (PROC8a (maintenance)).		
2.2 Control of Environmental Exposure		
Quantities Used		
Fraction of total tonnage used regionally	0.1	
Regional annual tonnage (tonnes year ⁻¹)	1.1E+07	
Fraction of regional tonnage used locally	1.4E-01	
Annual site tonnage (tonnes year ⁻¹)	1.5E+06	
Average daily usage (kg day ⁻¹)	5.0E+06	
Environmental Factors not affected by risk management		
Flow rate of receiving surface water (m ³ day ⁻¹)	Not defined (default = 18,000)	
Dilution factor	Freshwater	10
	Marine water	100
Operational conditions recommended to minimize environmental exposure		
Number of emission days per year	300	
Release fraction before RMM	Air	7.0E-04
	Waste water	4.4E-07
	Soil	0
Efficiency of technical measures used to reduce emission to named environmental compartment		
Air (%)	95	
Waste water (%)	87.7	
Soil (%)	Not defined	

Technical measures to achieve reduced emissions	Common practices vary across sites, thus conservative process release estimates used. Prevent discharge of undissolved substance to or recover from wastewater
Organizational measures to limit release from site	
Do not apply industrial sludge to natural soils Sludge should be incinerated, contained or reclaimed	
Conditions and measures related to municipal sewage treatment plant	
Size (m ³ day ⁻¹)	2000
Degradation efficiency (%)	88.8
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of the substance is generated to recover. Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.	
Substance release quantities after risk management measures	
Typical release to water (mg l ⁻¹)	Not defined
Maximum allowable site tonnage based on wastewater treatment, M _{safe} (kg day ⁻¹)	5.2E+06

3.0 Exposure estimation and reference to its source

Predicted workers exposure

Tool used to calculate exposure	ECETOC TRA
---------------------------------	------------

Process Category	Inhalation		Dermal		Combined
	Exposure (ppm)	RCR	Exposure (mg kg ⁻¹ day ⁻¹)	RCR	RCR
PROC1	0.01	0.06	0.03	0.57	0.63
PROC2	0.03	0.25	0.03	0.57	0.82
PROC2 (fuel filtering)	0.04	0.32	0.03	0.57	0.89
PROC2 (storage)	0.04	0.32	0.03	0.57	0.89
PROC3	0.04	0.32	0.03	0.57	0.89
PROC8a (maintenance)	0.00	0.02	0.05	0.83	0.85
PROC8b (bulk)	0.04	0.32	0.03	0.57	0.89
PROC8b (drum)	0.03	0.28	0.03	0.57	0.85
PROC16	0.01	0.08	0.03	0.57	0.65

Predicted environmental exposure

Tool used to calculate exposure	Petrorisk model using Hydrocarbon Block Method
---------------------------------	--

GAS OILS (PETROLEUM), HEAVY VACUUM is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PEC is not available for GAS OILS (PETROLEUM), HEAVY VACUUM for individual environmental compartments.

Exposure	STP	Freshwater	Marine water	Soil	Sediment freshwater	Sediment marine
RCR	5.6E-01	8.0E-01	8.0E-02	1.9E-03	9.1E-01	9.1E-02

Total Human Exposure due to the Environment:

Route of Exposure	Exposure ($\mu\text{g kg}^{-1} \text{ day}^{-1}$)	RCR
Oral	7.7	3.9E-01
Inhalation	11	5.7E-01

4.0 Guidance to Downstream Users

Scaling	Where other Risk Management Measures or Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)	
Exposure Tool used	Worker	ECETOC TRA
	Environmental	Petrorisk model using Hydrocarbon Block Method

ES4 – Use of GAS OILS (PETROLEUM), HEAVY VACUUM as a fuel (professional)

1.0 Description of Contributing Scenarios

Sector of Use	SU22 - Public domain (administration, education, entertainment, services, craftsmen)
Process Category	PROC1 PROC2 PROC2 (storage) PROC3 PROC8a (maintenance) PROC8b (bulk) PROC8b (drum) PROC8b (refueling) PROC16
Product Category	n/a
Article Category	n/a
Environmental Release Category	ERC9a - Wide dispersive indoor use in closed systems ERC9b - Wide dispersive outdoor use in closed systems
Specific Environmental Release Category	ESVOC SpERC 9.12b v.1

2.0 Operation conditions and risk management measures

2.1 Control of Worker exposure

Product Characteristics

Physical Form	Liquid, low volatility
Concentration of substance	Up to 100 %

Human factors not influenced by risk management

Potentially exposed body parts	Not defined
--------------------------------	-------------

Frequency and Duration of Use

Exposure duration (hours per day)	PROC1, PROC8a (maintenance), PROC16	Up to 8 hours
	PROC2 (storage)	Up to 4 hours
	PROC2, PROC8b (bulk), PROC8b (drum), PROC8b (refueling),	Up to 1 hour
	PROC3	Up to 15 minutes
Frequency of Use (days per year)	365	

Operational conditions affecting worker exposure

Location of use (Indoor/outdoor)	Not defined (default = indoor)
Location characteristics	Not defined

Assumes uses at not > 20 °C above ambient, unless stated differently
Assumes a good basic standard of occupational hygiene is implemented
Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance.
Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work

or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.		
Technical protective measures		
PROC1, PROC2, PROC3	Use in a closed system, Sample via a closed loop or other system intended to avoid exposure	
PROC2, PROC3, PROC8b (bulk), PROC8b (drum)	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) (70 % effectiveness)	
PROC2 (storage), PROC8a (maintenance)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) (30 % effectiveness)	
Organizational Measures to minimize worker exposure		
PROC8a (maintenance)	Drain down and flush system prior to equipment break-in or maintenance, retain drain downs in sealed storage pending disposal or subsequent recycle	
Risk Management Measures required to minimize worker exposure in the described scenario		
Respiratory protection	No specific measures identified	
Hand and Skin Protection	PROC1, PROC2 (storage), PROC3, PROC8b (drum), PROC8b (refueling)	Wear chemically resistant gloves tested to EN374 (in combination with 'basic' employee training (90 % effectiveness)
	PROC2, PROC8a (maintenance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training (95 % effectiveness)
Eye protection	No specific measures identified	
Other measures recommended to further reduce worker exposure		
Clear transfer lines prior to de-coupling, retains drain downs in sealed storage pending disposal or subsequent recycle (PROC 8b (bulk) and (drum)). Use long handled tools where possible. Decontaminate tools, equipment and PPE items in a segregated area (PROC8a (maintenance)).		
2.2 Control of Environmental Exposure		
Quantities Used		
Fraction of total tonnage used regionally	0.1	
Regional annual tonnage (tonnes year ⁻¹)	3.3E+05	
Fraction of regional tonnage used locally	5.0E-04	
Annual site tonnage (tonnes year ⁻¹)	1.7E+02	
Average daily usage (kg day ⁻¹)	4.6E+02	
Environmental Factors not affected by risk management		
Flow rate of receiving surface water (m ³ day ⁻¹)	Not defined (default = 18,000)	
Dilution factor	Freshwater	10
	Marine water	100
Operational conditions recommended to minimize environmental exposure		
Number of emission days per year	365	
Release fraction before RMM	Air	1.0E-04
	Waste water	1.0E-05
	Soil	1.0E-05
Efficiency of technical measures used to reduce emission to named environmental compartment		
Air (%)	N/a	
Waste water (%)	0	
Soil (%)	0	
Technical measures to achieve reduced emissions	Common practices vary across sites, thus conservative process release estimates used.	
Organizational measures to limit release from site		

Do not apply industrial sludge to natural soils Sludge should be incinerated, contained or reclaimed	
Conditions and measures related to municipal sewage treatment plant	
Size (m ³ day ⁻¹)	2000
Degradation efficiency (%)	88.8
Conditions and measures related to external treatment of waste for disposal	
This substance is consumed during use and no waste of the substance is generated to recover. Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment.	
Substance release quantities after risk management measures	
Typical release to water (mg l ⁻¹)	Not defined
Maximum allowable site tonnage based on wastewater treatment, M _{safe} (kg day ⁻¹)	2.3E+03

3.0 Exposure estimation and reference to its source

Predicted workers exposure

Tool used to calculate exposure	ECETOC TRA
---------------------------------	------------

Process Category	Inhalation		Dermal		Combined
	Exposure (ppm)	RCR	Exposure (mg kg ⁻¹ day ⁻¹)	RCR	RCR
PROC1	0.01	0.08	0.03	0.57	0.65
PROC2	0.06	0.50	0.02	0.28	0.78
PROC2 (storage)	0.04	0.32		0.57	0.89
PROC3	0.03	0.25	0.03	0.57	0.82
PROC8a (maintenance)	0.01	0.07	0.05	0.83	0.91
PROC8b (bulk)	0.03	0.28	0.03	0.57	0.85
PROC8b (drum)	0.03	0.28	0.03	0.57	0.85
PROC8b (refueling)	0.03	0.28	0.03	0.57	0.85
PROC16	0.01	0.08	0.03	0.57	0.65

Predicted environmental exposure

Tool used to calculate exposure	Petrorisk model using Hydrocarbon Block Method
---------------------------------	--

GAS OILS (PETROLEUM), HEAVY VACUUM is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the PEC of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore a PEC is not available for GAS OILS (PETROLEUM), HEAVY VACUUM for individual environmental compartments.

Exposure	STP	Freshwater	Marine water	Soil	Sediment freshwater	Sediment marine
RCR	1.2E-03	3.0E-2	6.8E-04	1.5E-03	3.9E-02	7.1E-04

Total Human Exposure due to the Environment:

Route of Exposure	Exposure (µg kg ⁻¹ day ⁻¹)	RCR
Oral	3.4	1.7E-01
Inhalation	0.53	2.7E-02

4.0 Guidance to Downstream Users

Scaling	Where other Risk Management Measures or Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not support the need for a DNEL to be established for other health effects. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)	
Exposure Tool used	Worker	ECETOC TRA
	Environmental	Petrorisk model using Hydrocarbon Block Method