CHEMICAL SAFETY REPORT

Part B

Vacuum Gas Oils, Hydrocracked Gas Oils, and Distillate Fuels

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9. EXPOSURE ASSESSMENT

Table 9.1. Identified Use Description and Exposure Scenario Number Key

IU	Category	Identified Use Name	Sector	ES Number	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Article Category (AC)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
1	Vacuum gas oils, hydrocracked gas oils and distillate fuels	01 – Manufacture of Substance	Industrial	ES 9.1.1	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	NA	1, 4	ESVOC SpERC 1.1.v1
2	Vacuum gas oils, hydrocracked gas oils and distillate fuels	01b – Use of Substance as Intermediate	Industrial	ES 9.2.1	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	NA	6a	ESVOC SpERC 6.1a.v1
3	Vacuum gas oils, hydrocracked gas oils and distillate fuels	01a – Distribution of Substance	Industrial	ES 9.3.1	3	NA	1, 2, 3, 4, 8a, 8b, 9, 15	NA	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
4	Vacuum gas oils, hydrocracked gas oils and distillate fuels	02 – Formulation & (Re)packing of Substances and Mixtures	Industrial	ES 9.4.1	3, 10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	NA	2	ESVOC SpERC 2.2.v1
5	Vacuum gas oils, hydrocracked gas oils and distillate fuels	03a – Uses in Coatings: Industrial	Industrial	ES 9.5.1	3	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15	NA	4	ESVOC SpERC 4.3a.v1
6	Vacuum gas oils, hydrocracked gas oils and distillate fuels	03b – Uses in Coatings: Professional	Professional	ES 9.6.1	22	NA	1, 2, 3, 4, 5, 8a, 8b, 10, 11, 13, 15, 19	NA	8a, 8d	ESVOC SpERC 8.3b.v1

7	Vacuum gas oils, hydrocracked gas oils and distillate fuels	05a – Use in Oil and Gas Field Drilling and Production Operations: Industrial	Industrial	ES 9.7.1	3	NA	1, 2, 3, 4, 8a, 8b	NA	4	QUALITATIVE ASSESSMENT FOR ENVIRONMENT
8	Vacuum gas oils, hydrocracked gas oils and distillate fuels	05b – Use in Oil and Gas field drilling and production operations: Professional	Professional	ES 9.8.1	22	NA	1, 2, 3, 4, 8a, 8b	NA	8d	QUALITATIVE ASSESSMENT FOR ENVIRONMENT
9	Vacuum gas oils, hydrocracked gas oils and distillate fuels	06a – Lubricants: Industrial	Industrial	ES 9.9.1	3	NA	1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18	NA	4, 7	ESVOC SpERC 4.6a.v1
10	Vacuum gas oils, hydrocracked gas oils and distillate fuels	06b – Lubricants: Professional (Low Release)	Professional	ES 9.10.1	22	NA	1, 2, 3, 4, 8a, 8b, 9, 10, 11, 13, 17, 18, 20	NA	9a, 9b	ESVOC SpERC 9.6b.v1
11	Vacuum gas oils, hydrocracked gas oils and distillate fuels	06c – Lubricants: Professional (High Release)	Professional	ES 9.11.1	22	NA	1, 2, 3, 4, 8a, 8b, 9, 10, 11, 13, 17, 18, 20	NA	8a, 8d	ESVOC SpERC 8.6c.v1
12	Vacuum gas oils, hydrocracked gas oils and distillate fuels	07a – Use in Metal Working Fluids / Rolling Oils: Industrial	Industrial	ES 9.12.1	3	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17	NA	4	ESVOC SpERC 4.7a.v1
13	Vacuum gas oils, hydrocracked gas oils and distillate fuels	10a – Use as Release Agents or Binders: Industrial	Industrial	ES 9.13.1	3	NA	1, 2, 3, 4, 6, 7, 8b, 10, 13, 14	NA	4	ESVOC SpERC 4.10a.v1
14	Vacuum gas oils, hydrocracked gas oils and distillate fuels	10b – Use as Release Agents or Binders: Professional	Professional	ES 9.14.1	22	NA	1, 2, 3, 4, 6, 8a, 8b, 10, 11, 14	NA	8a, 8d	ESVOC SpERC 8.10b.v1

15	Vacuum gas oils, hydrocracked gas oils and distillate fuels	12a – Use as a Fuel: Industrial	Industrial	ES 9.15.1	3	NA	1, 2, 3, 8a, 8b, 16	NA	7	ESVOC SpERC 7.12a.v1
16	Vacuum gas oils, hydrocracked gas oils and distillate fuels	12b – Use as a Fuel: Professional	Professional	ES 9.16.1	22	NA	1, 2, 3, 8a, 8b, 16	NA	9a, 9b	ESVOC SpERC 9.12b.v1
17	Vacuum gas oils, hydrocracked gas oils and distillate fuels	12c – Use as a Fuel: Consumer	Consumer	ES 9.17.1	21	13	NA	NA	9a, 9b	ESVOC SpERC 9.12c.v1
18	Vacuum gas oils, hydrocracked gas oils and distillate fuels	13a – Use as Functional Fluids: Industrial	Industrial	ES 9.18.1	3	NA	1, 2, 3, 4, 8a, 8b, 9	NA	7	ESVOC SpERC 7.13a.v1
19	Vacuum gas oils, hydrocracked gas oils and distillate fuels	15 – Use in Road and Construction Applications: Professional	Professional	ES 9.19.1	22	NA	8a, 8b, 9, 10, 11, 13	NA	8d, 8f	ESVOC SpERC 8.15.v1
20	Vacuum gas oils, hydrocracked gas oils and distillate fuels	18b – Explosives Manufacture & Use: Professional	Professional	ES 9.20.1	22	NA	1, 3, 5, 8a, 8b	NA	8e	ERC DEFINED RELEASE FRACTIONS
21	Vacuum gas oils, hydrocracked gas oils and distillate fuels	19 – Rubber Production and processing: Industrial	Industrial	ES 9.21.1	3, 10, 11	NA	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 13, 14, 15, 21	NA	1, 4, 6d	ESVOC SpERC 4.19.v1

The process of mapping uses and characterising risks has often identified a series of supporting measures that may further contribute to the management of exposure. The measures are identified in *blue* text in the Appendices contained in section 10. These measures are not contained within the Exposure Scenarios (ES) as they do not need to be implemented in order to achieve satisfactory exposure control. However, they are identified within the CSA in order that stakeholders are able to benefit from access to other exposure control information that has been obtained during the process of CSA/ES development.

9.1. Manufacture of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

9.1.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Manufacture of Substance	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 15 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	1, 4
Specific Environmental Release Category	ESVOC SpERC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling / recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
General exposures (Closed systems) CS15	Handle substance within a closed system E47

General exposures (Open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process Sampling CS2	No other specific measures identified EI20
Bulk closed loading and unloading CS501	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Bulk open loading and unloading CS503	Wear suitable gloves tested to EN374 PPE15
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Laboratory activities CS36	No other specific measures identified EI20
Bulk storage CS85	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.8e7
Fraction of Regional tonnage used locally	0.021
Annual site tonnage (tonnes/year)	6.0e5
Maximum daily site tonnage (kg/day)	2.0e6
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	90.3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	3.3e6
Assumed domestic sewage treatment plant flow (m^3/d)	10000
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated to treat [ETW4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated to recover [ERW2].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html). Scaled assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file attached to IUCLID section 13 – "Site-Specific Production" worksheet [DSU6]. For refinery sites where scaling revealed a condition of unsafe use (i.e., RCRs > 1), a site-specific chemical safety assessment was required [DSU8]. Taking into account the findings of the air-monitoring evaluation on benzene included as the Tier 2 analysis in the Low Boiling Point Naphtha category, the default "Air Removal Efficiency" of 90 % included in the SPERC has been shown to be over-conservative and that 95 % efficiency can safely be claimed in a Tier II analysis. On this basis, the Tier 2 analysis demonstrates that no refineries have RCRs>1 (see PETRORISK file in IUCLID section 13 – "Tier 2 Site Specific Production worksheet").	

9.1.2. Exposure Estimation

9.1.2.1. Human Health

See Appendix 2.a and 2.b

9.1.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.2. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Intermediate – Industrial

9.2.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as Substance as Intermediate	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 15 Further information on the mapping and allocation of PROC codes is contained in Table 9.1
Environmental Release Categories	6a
Specific Environmental Release Category	ESVOC SpERC 6.1a.v1
Processes, tasks, activities covered	
Use of substance as an intermediate. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
General exposures (Closed systems) CS15	Handle substance within a closed system E47

General exposures (Open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process Sampling CS2	No other specific measures identified EI20
Bulk closed loading and unloading CS501	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Bulk open loading and unloading CS503	Wear suitable gloves tested to EN374 PPE15
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Laboratory activities CS36	No other specific measures identified EI20
Bulk storage CS85	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.5e5
Fraction of Regional tonnage used locally	0.043
Annual site tonnage (tonnes/year)	1.5e4
Maximum daily site tonnage (kg/day)	5.0e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	51.6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	4.1e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
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 treat [ETW5].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated to recover [ERW3].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.2.2. Exposure Estimation

9.2.2.1. Human Health

See Appendix 2.a and 2.b

9.2.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.3. Distribution of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

9.3.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Distribution of Substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
General exposures (Closed systems) CS15	Handle substance within a closed system E47

General exposures (Open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process sampling CS2	No other specific measures identified EI20
Laboratory activities CS36	No other specific measures identified EI20
Bulk closed loading and unloading CS501	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Bulk open loading and unloading CS503	Wear suitable gloves tested to EN374 PPE15
Drum and small pack filling CS6	Wear suitable gloves tested to EN374 PPE15
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Handle substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tones/year)	2.8e7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	5.6e4
Maximum daily site tonnage (kg/day)	1.9e5
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	1.0e-6
Release fraction to soil from process (initial release prior to RMM)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by human via indirect exposure (primarily ingestion) [TCR1j] Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14].No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	

Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.9e6
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.3.2. Exposure Estimation

9.3.2.1. Human Health

See Appendix 2.a and 2.b

9.3.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.4. Formulation & (Re)packing of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

9.4.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Formulation & (Re)packing of Substances and Mixtures	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletization, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3

General exposures (closed systems) CS15	Handle substance within a closed system E47
General exposures (open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process sampling CS2	No other specific measures identified EI20
Drum and batch transfers CS8	Use drum pumps or carefully pour from container E64 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Bulk transfers CS14	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Mixing operations (open systems) CS30	Provide extract ventilation to points where emissions occur E54 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Production or preparation or articles by tabletting, compression, extrusion or pelletisation CS100	Wear suitable gloves tested to EN374 PPE15
Drum and small package filling CS8	Wear suitable gloves tested to EN374 PPE15
Laboratory activities CS36	No other specific measures identified EI20
Equipment clean down and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.8e7
Fraction of Regional tonnage used locally	0.0011
Annual site tonnage (tonnes/year)	3.0e4
Maximum daily site tonnage (kg/day)	1.0e5
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	2.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0

Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	59.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	6.8e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.4.2. Exposure Estimation

9.4.2.1. Human Health

See Appendix 2.a and 2.b

9.4.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.5. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) in Coatings R20, R38, R40, R65, R51/53 – Industrial

9.5.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Uses in Coatings	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC SpERC 4.3a.v1
Processes, tasks, activities covered	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (closed systems) CS15	Handle substance within a closed system E47
Bulk transfers CS14	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Material transfers; Drum/batch transfers; Transfer from/pouring from containers CS3, CS8, CS22	Wear suitable gloves tested to EN374 PPE15
Preparation of material for application; Mixing operations (open systems) CS96, CS30	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Film formation - force drying, stoving and other technologies CS99	Handle substance within a closed system E47 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11.
Film formation - air drying CS95	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11.Wear suitable gloves tested to EN374 PPE15
Spraying (automatic/robotic) CS97	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60 Wear suitable gloves tested to EN374 PPE15.Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11
Manual spraying CS24	Wear a respirator conforming to EN140 with Type A/P2 filter or better. PPE29 Wear chemically resistant gloves (tested to type EN374) in combination with specific activity training PPE17 Ensure operatives are trained to minimise exposures EI19 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11
Roller, spreader, flow application. CS69	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17
Dipping, immersion and pouring. CS4	Wear suitable gloves tested to EN374 PPE15
Production of preparations or articles by tabletting, compression, extrusion, pelletisation CS100	No other specific measures identified EI20
Laboratory activities CS36	No other specific measures identified EI20
Equipment clean down and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Handle substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	8.1e3
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	8.1e3
Maximum daily site tonnage (kg/day)	2.7e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.98
Release fraction to wastewater from process (initial release prior to RMM)	7.0e-5
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	58.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.4e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.5.2. Exposure Estimation

9.5.2.1. Human Health

See Appendix 2.a.

9.5.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.6. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Coatings – Professional

9.6.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Uses in Coatings	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 10, 11, 13, 15, 19 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8a, 8d
Specific Environmental Release Category	ESVOC SpERC 8.3b.v1
Processes, tasks, activities covered	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (closed systems) CS15	Handle substance within a closed system E47
Filling / preparation of equipment from drums or containers CS45	Wear suitable gloves tested to EN374 PPE15
Material transfers, Pumped Drum/batch transfers CS3, CS8	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Preparation of material for application; Mixing operations (closed systems) CS96, CS29	No other specific measures identified EI20
Preparation of material for application, mixing operations (open systems) CS66,CS30	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Film formation - air drying CS95	Wear suitable gloves tested to EN374 PPE15
Manual spraying, indoor CS24, OC8	Carry out in a vented booth or extracted enclosure E57 Wear suitable gloves tested to EN374 PPE15 Limit the substance content in the product to 25 % OC18 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11
Manual spraying, outdoor CS24, OC9	Wear a respirator conforming to EN140 with Type A/P2 filter or better. PPE29 Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17 Limit the substance content in the product to 25 % OC18 Avoid carrying out activities involving exposure for more than 4 hours OC28 Ensure operatives are trained to minimise exposures EI19
Roller, spreader, flow application CS69	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16 Limit the substance content in the product to 25 % OC18
Dipping, immersion and pouring CS4	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16.
Hand application - fingerpaints, pastels, adhesives CS72	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17 Limit the substance content in the product to 5 % OC17
Laboratory activities CS36	No other specific measures identified EI20
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance E65 Wear chemically resistant gloves (tested to type EN374) in combination with basic employee training PPE16
Storage CS67	Store substance within a closed system E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.3e3
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.2
Maximum daily site tonnage (kg/day)	3.2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	

Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.98
Release fraction to wastewater from process (initial release prior to RMM)	0.01
Release fraction to soil from process (initial release prior to RMM)	0.01
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	5.0e1
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	

4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.6.2. Exposure Estimation

9.6.2.1. Human Health

See Appendix 2.a and 2.b

9.6.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.7. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Oil and Gas Field Drilling and Production Operations – Industrial

9.7.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use in Oil and Gas Field Drilling and Production Operations	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 8a, 8b *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	4
Specific Environmental Release Category	Qualitative assessment
Processes, tasks, activities covered	
Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3

Bulk transfers CS14	Transfer via enclosed lines E52
Filling / preparation of equipment from drums or containers. CS45	Wear suitable gloves tested to EN374 PPE15.
Drilling mud (re-) formulation. CS115	No other specific measures identified EI20
Drill floor operations CS116	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Operation of solids filtering equipment CS117 Elevated temperature CS111	Provide the operation with a properly sited receiving hood E71.
Cleaning of solids filtering equipment CS120	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Cuttings treatment and disposal CS515	Provide extract ventilation to points where emissions occur E54
Sample collection CS2	No other specific measures identified EI20
General exposures (closed systems) CS15	Handle substance within a closed system E47
General exposures (open systems) CS16	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Pouring from small containers CS9	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Equipment cleaning and maintenance CS39	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region [A1]	1
Regional use tonnage (tonnes/year) [A2]	7.75E+03
Fraction of Regional tonnage used locally [A3]	Not Applicable
Annual site tonnage (tonnes/year) [A5]	Not Applicable
Maximum daily site tonnage (kg/day) [A4]	Not Applicable
Frequency and duration of use	
Emission days (days/year) [FD4]	Not Applicable
Environmental factors not influenced by risk management	
Local marine water dilution factor [EF2]	Not Applicable
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM) [OOC4]	Not Applicable
Release fraction to wastewater from process (initial release prior to RMM) [OOC5]	Not Applicable
Technical conditions and measures at process level (source) to prevent release	
Discharge to aquatic environment is restricted (see Section 4.2).	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Not Applicable	
Treat air emission to provide a typical removal efficiency of (%) [TCR7]	Not Applicable
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	Not Applicable
If discharging to domestic sewage treatment plant, provide the required	Not Applicable

onsite wastewater removal efficiency of ≥ (%)	
Organisation measures to prevent/limit release from site	
Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	Not Applicable
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	Not Applicable
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	Not Applicable
Assumed domestic sewage treatment plant flow (m^3/d)	Not Applicable
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.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external treatment of waste for disposal	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Discharge to aquatic environment is restricted by law and industry prohibits release.[1] [1]OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007.	

9.7.2. Exposure Estimation

9.7.2.1. Human Health

See Appendix 2.a and 2.b

9.7.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.8. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Oil and Gas Field Drilling and Production Operations – Professional

9.8.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use in Oil and Gas Field Drilling and Production Operations	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 8a, 8b *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8d
Specific Environmental Release Category	Qualitative assessment
Processes, tasks, activities covered	
Oil field well drilling operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
Bulk transfers CS14	Wear suitable gloves tested to EN374 PPE15

Filling / preparation of equipment from drums or containers. CS45	Wear suitable gloves tested to EN374 PPE15
Drilling mud (re-) formulation. CS115	No other specific measures identified EI20
Drill floor operations CS116	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Operation of solids filtering equipment CS117 Elevated temperature CS111	Provide the operation with a properly sited receiving hood E71.
Cleaning of solids filtering equipment CS120	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Cuttings treatment and disposal CS515	Provide extract ventilation to points where emissions occur E54
Sample collection CS2	No other specific measures identified EI20
General exposures (closed systems) CS15	Handle substance within a closed system E47
General exposures (open systems) CS16	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Pouring from small containers CS9	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Equipment cleaning and maintenance CS39	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Store substance within a closed system. E84

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3

Section 2.2 Control of environmental exposure

Product characteristics

Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].

Amounts used

Fraction of EU tonnage used in region [A1]	1
Regional use tonnage (tonnes/year) [A2]	7.75E+03
Fraction of Regional tonnage used locally [A3]	Not Applicable
Annual site tonnage (tonnes/year) [A5]	Not Applicable
Maximum daily site tonnage (kg/day) [A4]	Not Applicable

Frequency and duration of use

Emission days (days/year) [FD4]	Not Applicable

Environmental factors not influenced by risk management

Local marine water dilution factor [EF2]	Not Applicable

Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM) [OOC4]	Not Applicable
Release fraction to wastewater from process (initial release prior to RMM) [OOC5]	Not Applicable

Technical conditions and measures at process level (source) to prevent release

Discharge to aquatic environment is restricted (see Section 4.2).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Not Applicable

Treat air emission to provide a typical removal efficiency of (%) [TCR7]	Not Applicable
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	Not Applicable
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	Not Applicable

Organisation measures to prevent/limit release from site	
Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	Not Applicable
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	Not Applicable
Maximum allowable site tonnage (M_{Safe}) based on domestic sewage treatment release (kg/d)	Not Applicable
Assumed domestic sewage treatment plant flow (m^3/d)	Not Applicable
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.	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external treatment of waste for disposal	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Discharge to aquatic environment is restricted by law and industry prohibits release.[1] [1]OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007.	

9.8.2. Exposure Estimation

9.8.2.1. Human Health

See Appendix 2.a and 2.b

9.8.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.9. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Lubricants – Industrial

9.9.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Lubricants	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	4, 7
Specific Environmental Release Category	ESVOC SpERC 4.6a.v1
Processes, tasks, activities covered	
Covers the use of formulated lubricants in closed and open systems including material transfers operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (Closed systems) CS15	Handle substance within a closed system E47.
General exposures (Open systems) CS16	Provide extract ventilation to points where emissions occur. E54
Bulk transfers CS14	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Filling preparation of equipment from drums or containers CS45	Wear gloves tested to EN374 PPE15
Initial factory fill of equipment CS75	Wear suitable gloves tested to EN374 PPE15
Operation and lubrication of high energy open equipment CS17	Provide extract ventilation to points where emissions occur E54 Restrict area of openings to equipment E68
Manual roller application or brushing CS13	Wear suitable gloves tested to EN374 with specific employee training PPE17
Treatment of articles by dipping and pouring CS35	Wear chemically resistant gloves (tested to EN374) PPE15
Spraying CS10	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings E60 Wear suitable gloves tested to EN374, coveralls and eye protection PPE23
Maintenance (of larger plant items) and machine set up CS77	Ensure material transfers are under containment or extract ventilation E66 Provide extract ventilation to emission points when contact with warm (>50oC) lubricant is likely E67 Wear suitable gloves tested to EN374 PPE15
Maintenance of small items CS18	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Re-manufacture of reject articles CS19	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.7e4
Fraction of Regional tonnage used locally	0.0036
Annual site tonnage (tonnes/year)	1.0e2
Maximum daily site tonnage (kg/day)	5.0e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	5.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
Release fraction to soil from process (initial release prior to RMM)	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	70
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	7.8e4
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.9.2. Exposure Estimation

9.9.2.1. Human Health

See Appendix 2.a and 2.b

9.9.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.10. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Lubricants – Professional: Low Environmental Release

9.10.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Lubricants – Professional: Low Environmental Release	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 13, 17, 20 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.6b.v1
Processes, tasks, activities covered	
Covers the use of formulated lubricants in closed and open systems including material transfers operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (Closed systems) CS15	Handle substance within a closed system E47 PPE15
Operation of equipment containing engine oils and similar CS26	No other specific measures identified EI20
General exposures (Open systems) CS16	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40 Wear suitable gloves tested to EN374 PPE15
Bulk transfers CS14	Wear suitable gloves tested to EN374 PPE15 Avoid carrying out activities involving exposure for more than 4 hours OC28
Filling preparation of equipment from drums or containers CS45; dedicated facility CS81	Use drum pumps or carefully pour from container E64 Wear suitable gloves tested to EN374 PPE15
Filling preparation of equipment from drums or containers CS45; non-dedicated facility CS82	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Operation and lubrication of high energy open equipment CS17 Indoor OC8	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11
Operation and lubrication of high energy open equipment CS17 Outdoor OC9	Ensure operation is undertaken outdoors E69 Avoid carrying out activities involving exposure for more than 4 hours OC28 Limit the substance content in the product to 25 % OC18 Wear suitable gloves tested to EN374 PPE15 Ensure operatives are trained to minimise exposures EI19
Maintenance (of larger plant items) and machine set up CS77	Ensure material transfers are under containment or extract ventilation E66 Provide extract ventilation to emission points when contact with warm (>50oC) lubricant is likely E67 Wear suitable gloves tested to EN374 PPE15
Maintenance of small items CS18	Drain or remove substance from equipment prior to break-in or maintenance E81 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Engine lubricant service CS78	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Manual roller application or brushing CS13	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17
Spraying CS10 with local exhaust ventilation CS109	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings E60 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16 Ensure operatives are trained to minimise exposures EI19
Spraying CS10 without local exhaust ventilation CS110	Wear a full face respirator conforming to EN140 with Type A/P2 filter or better. PPE32. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18 Limit the substance content in the product to 25 % OC18 Avoid carrying out activities involving exposure for more than 4 hours OC28
Treatment of articles by dipping and pouring CS35	Wear suitable gloves tested to EN374 PPE15
Storage CS67	Store substance within a closed system E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	

Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.2e3
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.6
Maximum daily site tonnage (kg/day)	4.4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.01
Release fraction to wastewater from process (initial release prior to RMM)	0.01
Release fraction to soil from process (initial release prior to RMM)	0.01
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	6.8e1
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.10.2. Exposure Estimation

9.10.2.1. Human Health

See Appendix 2.a and 2.b

9.10.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.11. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Lubricants – Professional: High Environmental Release

9.11.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Lubricants – Professional: High Environmental Release	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 13, 17, 20 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8a, 8d
Specific Environmental Release Category	ESVOC SpERC 8.6c.v1
Processes, tasks, activities covered	
Covers the use of formulated lubricants in closed and open systems including material transfers operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (Closed systems) CS15	Handle substance within a closed system E47 PPE15
Operation of equipment containing engine oils and similar CS26	No other specific measures identified EI20
General exposures (Open systems) CS16	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) E40 Wear suitable gloves tested to EN374 PPE15
Bulk transfers CS14	Wear suitable gloves tested to EN374 PPE15 Avoid carrying out activities involving exposure for more than 4 hours OC28
Filling preparation of equipment from drums or containers CS45; dedicated facility CS81	Use drum pumps or carefully pour from container E64 Wear suitable gloves tested to EN374 PPE15
Filling preparation of equipment from drums or containers CS45; non-dedicated facility CS82	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Operation and lubrication of high energy open equipment CS17 Indoor OC8	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11
Operation and lubrication of high energy open equipment CS17 Outdoor OC9	Ensure operation is undertaken outdoors E69 Avoid carrying out activities involving exposure for more than 4 hours OC28 Limit the substance content in the product to 25 % OC18 Wear suitable gloves tested to EN374 PPE15 Ensure operatives are trained to minimise exposures EI19
Maintenance (of larger plant items) and machine set up CS77	Ensure material transfers are under containment or extract ventilation E66 Provide extract ventilation to emission points when contact with warm (>50oC) lubricant is likely) E67 Wear suitable gloves tested to EN374 PPE15
Maintenance of small items CS18	Drain or remove substance from equipment prior to break-in or maintenance E81 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Engine lubricant service CS78	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Manual roller application or brushing CS13	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17
Spraying CS10	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings E60 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16 Ensure operatives are trained to minimise exposures EI19 If technical measures not practical: G16 Wear a full face respirator conforming to EN140 with Type A/P2 filter or better. PPE32. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18 Limit the substance content in the product to 25 % OC18 Avoid carrying out activities involving exposure for more than 4 hours OC28
Treatment of articles by dipping and pouring CS35	Wear suitable gloves tested to EN374 PPE15
Storage CS67	Store substance within a closed system E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	

Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.2e3
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.6
Maximum daily site tonnage (kg/day)	4.4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.5e-1
Release fraction to wastewater from process (initial release prior to RMM)	0.05
Release fraction to soil from process (initial release prior to RMM)	0.05
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	6.8e1
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	

4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.11.2. Exposure Estimation

9.11.2.1. Human Health

See Appendix 2.a and 2.b

9.11.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.12. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Metal Working Fluids/Rolling Oils – Industrial

9.12.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use in Metal Working Fluids/Rolling Oils	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC SpERC 4.7a.v1
Processes, tasks, activities covered	
Covers the use in formulated MWFs/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious

	suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. E4
General exposures (Closed systems) CS15	Handle substance within a closed system E47
General exposures (Open systems) CS16	Provide extract ventilation to points where emissions occur E54
Bulk transfers CS14	Handle substance within a closed system. E47 Wear gloves tested to EN374 PPE15
Filling preparation of equipment from drums or containers CS45	Wear gloves tested to EN374 PPE15
Process sampling CS2	No other specific measures identified EI20
Metal Machining Operations CS79	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60
Treatment of articles by dipping and pouring CS35	Wear gloves tested to EN374 PPE15
Spraying CS10	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings E60 Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .E11 Wear gloves tested to EN374, coveralls and eye protection PPE23
Manual roller application or brushing CS13	Wear suitable gloves tested to EN374 with specific employee training PPE17
Automated metal rolling/forming CS80	Handle substance within a predominantly closed system provided with extract ventilation E49
Semi-automated metal rolling/forming CS83	Provide extract ventilation to points where emissions occur E54.
Equipment cleaning and maintenance CS39.	Drain down system prior to equipment break-in or maintenance E55 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.0e4
Fraction of Regional tonnage used locally	0.0097
Annual site tonnage (tonnes/year)	1.0e2
Maximum daily site tonnage (kg/day)	5.0e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.02
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	70
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	7.8e4
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.12.2. Exposure Estimation

9.12.2.1. Human Health

See Appendix 2.a and 2.b

9.12.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.13. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Release Agents or Binders – Industrial

9.13.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as Release Agents or Binders	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 6, 7, 8b, 10, 13, 14 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC SpERC 4.10a.v1
Processes, tasks, activities covered	
Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing), mould forming and casting, and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. E4

Bulk transfers CS14	Handle substance within a closed system E47
Drum and batch transfers CS8	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Mixing operations (closed systems) CS29	No other specific measures identified EI20
Mixing operations (open systems) CS30	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Mould forming CS31	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Casting Operations (open systems) CS32, CS108	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60 Wear suitable gloves tested to EN374 PPE15
Spraying (machine) CS10, CS33	Minimise exposure by extracted full enclosure for the operation or equipment E61 Wear suitable gloves tested to EN374 PPE15
Spraying (manual) CS10, CS34	Wear a full face respirator conforming to EN140 with Type A/P2 filter or better. PPE32 Wear suitable gloves (tested to EN374), coverall and eye protection. PPE23 Ensure operatives are trained to minimise exposures. EI19
Manual applications e.g. brushing, rolling CS13	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17
Equipment clean down and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Handle substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.4e4
Fraction of Regional tonnage used locally	0.18
Annual site tonnage (tonnes/year)	2.5e3
Maximum daily site tonnage (kg/day)	2.5e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	100
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-7
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide	0

the required removal efficiency ≥ (%)	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.7e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.13.2. Exposure Estimation

9.13.2.1. Human Health

See Appendix 2.a and 2.b

9.13.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.14. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Release Agents or Binders – Professional

9.14.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as Release Agents or Binders	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 6, 8a, 8b, 10, 11, 14 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8a, 8d
Specific Environmental Release Category	ESVOC SpERC 8.10b.v1
Processes, tasks, activities covered	
Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. E4

Bulk transfers (closed systems) CS3, CS107	No other specific measures identified EI20
Drum/batch transfers CS8	Wear suitable gloves tested to EN374 PPE15
Mixing operations (closed systems) CS29	No other specific measures identified EI20
Mixing operations (open systems) CS30	Wear suitable gloves tested to EN374 PPE15
Mould forming CS31	Provide extract ventilation to points where emissions occur E54 Wear suitable gloves tested to EN374 PPE15
Casting Operations, with local exhaust ventilation CS32, CS109	Provide extract ventilation to points where emissions occur E54 Wear suitable gloves tested to EN374 PPE15
Casting Operations, without local exhaust ventilation CS32, CS110	Wear a respirator conforming to EN140 with Type A/P2 filter or better. PPE29 Wear suitable gloves (tested to EN374), coverall and eye protection. PPE23
Spraying (manual) CS10, CS34 with local exhaust ventilation CS109	Apply ventilation or undertake in ventilated enclosure E57 Wear suitable gloves (tested to EN374), coverall and eye protection PPE23 Ensure operatives are trained to minimise exposures EI19
Spraying (manual) CS10, CS34 without local exhaust ventilation CS110	Wear a full face respirator conforming to EN140 with Type A/P2 filter or better.PPE32 Wear suitable gloves (tested to EN374), coverall and eye protection. PPE23 Ensure operatives are trained to minimise exposures. EI19
Manual applications e.g. brushing, rolling CS34, CS51	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance E65 Wear chemically resistant gloves (tested to type EN374) in combination with basic employee training PPE16
Storage CS67	Store substance within a closed system E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.9e3
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.5
Maximum daily site tonnage (kg/day)	4.0
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.95
Release fraction to wastewater from process (initial release prior to RMM)	0.025
Release fraction to soil from process (initial release prior to RMM)	0.025
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	6.2e1
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.14.2. Exposure Estimation

9.14.2.1. Human Health

See Appendix 2.a and 2.b

9.14.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.15. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Industrial

9.15.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as a Fuel	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 16 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
Bulk transfers CS14	Wear suitable gloves tested to EN374. PPE15
Drum/batch transfers CS8	Wear suitable gloves tested to EN374.PPE15

Use as a fuel (closed systems) GEST_12I, CS107	No other specific measures identified EI20
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance E65 Wear chemically resistant gloves (tested to type EN374) in combination with 'basic' employee training PPE16
Storage CS67	Handle substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	4.5e6
Fraction of Regional tonnage used locally	0.34
Annual site tonnage (tonnes/year)	1.5e6
Maximum daily site tonnage (kg/day)	5.0e6
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	5.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	97.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	60.4
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.7
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	5.0e6
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	

Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2].
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable regulations [ERW1].
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.15.2. Exposure Estimation

9.15.2.1. Human Health

See Appendix 2.a and 2.b

9.15.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.16. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Professional

9.16.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as a Fuel	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 8a, 8b, 16 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12b.v1
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
Bulk transfers CS14	Wear suitable gloves tested to EN374. PPE15
Drum/batch transfers CS8	Use drum pumps or carefully pour from container E64 Wear suitable gloves tested to EN374.PPE15

Refuelling activities CS507	Wear suitable gloves tested to EN374 PPE15
Use as a fuel (closed systems) GEST_12I, CS107	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) E11 **or** Ensure operation is undertaken outdoors E69
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance E65 Wear chemically resistant gloves (tested to EN374) in combination with basic employee training PPE16
Storage CS67	Store substance within a closed system E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	6.7e6
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	3.3e3
Maximum daily site tonnage (kg/day)	9.2e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-4
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
Release fraction to soil from process (initial release prior to RMM)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.4e5

Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.16.2. Exposure Estimation

9.16.2.1. Human Health

See Appendix 2.a and 2.b

9.16.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.17. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Consumer

9.17.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53		
Title		
Use as a Fuel		
Use Descriptor		
Sector(s) of Use		21
Product Categories		13 *Further information on the mapping and allocation of PC codes is contained in Table 9.1*
Environmental Release Categories		9a, 9b
Specific Environmental Release Category		ESVOC SpERC 9.12c.v1
Processes, tasks, activities covered		
Covers consumer uses in fuels.		
Assessment Method		
See Section 3.		
Section 2 Operational conditions and risk management measures		
Section 2.1 Control of consumer exposure		
Product characteristics		
Physical form of product		liquid
Vapour pressure (kPa)		Liquid, vapour pressure > 10 Pa OC15
Concentration of substance in product		Unless otherwise stated, cover concentrations up to 100% [ConsOC1]
Frequency and duration of use/exposure		Unless otherwise stated, covers use amounts up to 37500g [ConsOC2]; covers skin contact area up to 420cm2 [ConsOC5]
Other Operational Conditions affecting exposure		Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]
Product Category		**Specific Risk Management Measures and Operating Conditions**
PC13:Fuels--Liquid - subcategories added: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 37500g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated [ConsRMM15]
PC13:Fuels--Liquid - subcategories added: Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated [ConsRMM15]
PC13:Fuels--Liquid (subcategories added): Garden	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 420.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 750g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10];

Equipment - Refuelling		covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated [ConsRMM15]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3		
Section 2.2 Control of environmental exposure		
Product characteristics		
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].		
Amounts used		
Fraction of EU tonnage used in region		0.1
Regional use tonnage (tonnes/year)		1.6e7
Fraction of Regional tonnage used locally		0.0005
Annual site tonnage (tonnes/year)		8.2e3
Maximum daily site tonnage (kg/day)		2.3e4
Frequency and duration of use		
Continuous release [FD2].		
Emission days (days/year)		365
Environmental factors not influenced by risk management		
Local freshwater dilution factor		10
Local marine water dilution factor		100
Other given operational conditions affecting environmental exposure		
Risk from environmental exposure is driven by humans via indirect exposure (primarily ingestion) [TCR1j].		
Release fraction to air from wide dispersive use (regional only)		1.0e-4
Release fraction to wastewater from wide dispersive use		0.00001
Release fraction to soil from wide dispersive use (regional only)		0.00001
Conditions and measures related to municipal sewage treatment plant		
Estimated substance removal from wastewater via domestic sewage treatment (%)		94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)		3.5e5
Assumed domestic sewage treatment plant flow (m^3/d)		2000
Conditions and measures related to external treatment of waste for disposal		
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2].		
Conditions and measures related to external recovery of waste		
External recovery and recycling of waste should comply with applicable regulations [ERW1].		
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.		
Section 3 Exposure Estimation		
3.1. Health		
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.		
3.2. Environment		
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].		
Section 4 Guidance to check compliance with the Exposure Scenario		
4.1. Health		
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.		

4.2. Environment
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.17.2. Exposure Estimation

9.17.2.1. Human Health

See Appendix 2.c

9.17.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.18. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Functional Fluids – Industrial

9.18.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use as Functional Fluids	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 8a, 8b, 9 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 7.13a.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
Bulk transfers CS14	No other specific measures identified EI20
Drum/batch transfers CS8	Wear suitable gloves tested to EN374 PPE15

Filling of articles/equipment (closed systems) CS84, CS107	Transfer via enclosed lines E52
Filling / preparation of equipment from drums or containers CS45	Wear suitable gloves tested to EN374 PPE15
Equipment operation (closed systems) CS15	No other specific measures identified EI20
Equipment operation (open systems) CS16	Restrict area of openings and provide extract ventilation to emission points when substance handled at elevated temperatures E75
Re-work and re-manufacture of articles CS19	Wear suitable gloves tested to EN374 PPE15
Equipment cleaning and maintenance CS39	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	6.4e3
Fraction of Regional tonnage used locally	0.0016
Annual site tonnage (tonnes/year)	1.0e1
Maximum daily site tonnage (kg/day)	5.0e2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	5.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
Release fraction to soil from process (initial release prior to RMM)	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by humans via indirect exposure (primarily injestion) [TCR1j]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	

Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	7.8e3
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.18.2. Exposure Estimation

9.18.2.1. Human Health

See Appendix 2.a and 2.b

9.18.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.19. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Road and Construction Applications – Professional

9.19.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Use in Road and Construction Applications	
Use Descriptor	
Sector(s) of Use	22
Process Categories	8a, 8b, 9, 10, 11, 13 *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8d, 8f
Specific Environmental Release Category	ESVOC SpERC 8.15.v1
Processes, tasks, activities covered	
Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying. E4

Drum/batch transfers (Non-dedicated facility) CS8, CS82	Wear gloves tested to EN374 PPE15
Drum/batch transfers (dedicated facility) CS8, CS81	Wear gloves tested to EN374 PPE15
Spraying/fogging by machine application CS25	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60 Ensure operation is undertaken outdoors E69 Wear gloves tested to EN374 PPE15
Manual applications e.g. brushing, rolling CS13	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training PPE17
Dipping, immersion and pouring CS4	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Equipment cleaning and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65.Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Store substance within a closed system. E84	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.1e4
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.5e1
Maximum daily site tonnage (kg/day)	4.2e1
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.95
Release fraction to wastewater from process (initial release prior to RMM)	0.01
Release fraction to soil from process (initial release prior to RMM)	0.04
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	12.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	

Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	6.2e2
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.19.2. Exposure Estimation

9.19.2.1. Human Health

See Appendix 2.a and 2.b

9.19.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.20. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Explosives Manufacture and Use – Professional

9.20.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Explosives Manufacture and Use	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 3, 5, 8a, 8b *Further information on the mapping and allocation of PROC codes is contained in Table 9.1*
Environmental Release Categories	8e
Specific Environmental Release Category	*Not Applicable*
Processes, tasks, activities covered	
Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. G15. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3
General exposures (closed systems) CS15	Handle substance within a closed system E47

General exposures (open systems) CS16	Wear suitable gloves tested to EN374 PPE15
Process sampling CS2	No specific measures identified EI18
Drum and batch transfers CS8	Use drum pumps or carefully pour from container E64 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Bulk transfers CS14	Handle substance within a closed system E47 Wear suitable gloves tested to EN374 PPE15
Mixing operations (open systems) CS30	Provide extract ventilation to points where emissions occur E54 Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training PPE16
Production or preparation or articles by tabletting, compression, extrusion or pelletisation CS100	Wear suitable gloves tested to EN374 PPE15
Drum and small package filling CS8	Wear suitable gloves tested to EN374 PPE15
Laboratory activities CS36	No specific measures identified EI18
Equipment clean down and maintenance CS39	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.3e4
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	6.7
Maximum daily site tonnage (kg/day)	1.8e1
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.001
Release fraction to wastewater from process (initial release prior to RMM)	0.02
Release fraction to soil from process (initial release prior to RMM)	0.01
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	8.8
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0

Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	2.9e2
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3].	

9.20.2. Exposure Estimation

9.20.2.1. Human Health

See Appendix 2.a and 2.b

9.20.2.2. Environment

See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.21. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Rubber Production and Processing – Industrial

9.21.1. Exposure Scenario

Section 1 Exposure Scenario Title Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53	
Title	
Rubber Production and Processing	
Use Descriptor	
Sector(s) of Use	3, 10, 11
Process Categories	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 13, 14, 15, 21 Further information on the mapping and allocation of PROC codes is contained in Table 9.1
Environmental Release Categories	1, 4, 6d
Specific Environmental Release Category	ESVOC SpERC 4.19.v1
Processes, tasks, activities covered	
Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, calendaring, vulcanising, cooling and finishing as well as maintenance	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure (kPa)	Liquid, vapour pressure <0.5 kPa at STP. OC3.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Other Operational Conditions affecting exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature). OC7. Assumes a good basic standard of occupational hygiene is implemented G1.
Contributing Scenarios	**Specific Risk Management Measures and Operating Conditions**
General measures applicable to all activities CS135	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions. G25
General measures (skin irritants) G19	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. E3 Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities

	which are likely to lead to substantial aerosol release, e.g. spraying. E4
Bulk transfers (closed systems) CS14, CS107	No other specific measures identified EI20
Bulk transfers (open systems) CS14, CS108	Wear suitable gloves tested to EN374 PPE15
Material transfers CS3	Wear suitable gloves tested to EN374. PPE15
Bulk weighing CS91	Wear suitable gloves tested to EN374.PPE15 No other specific measures identified EI20
Small scale weighing CS90	Wear suitable gloves tested to EN374 PPE15
Additive pre-mixing CS92	Wear suitable gloves tested to EN374.PPE15
Calendaring (including Banburys) CS64	Handle substance within a predominantly closed system provided with extract ventilation E49 Wear suitable gloves tested to EN374 PPE15
Pressing uncured rubber blanks CS73	Wear suitable gloves tested to EN374 PPE15
Tyre build-up CS112	Minimise exposure by extracted full enclosure for the operation or equipment E61 Wear suitable gloves (tested to EN374), coverall and eye protection PPE23
Vulcanisation CS70	Provide extract ventilation to material transfer points and other openings E82
Cooling cured articles CS71	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings E60
Production of articles by dipping and pouring CS113	Wear suitable gloves tested to EN374 PPE15
Finishing operations CS102	Wear suitable gloves tested to EN374 PPE15
Laboratory activities CS36	No other specific measures identified EI20
Equipment clean down and maintenance CS39	Drain or remove substance from equipment prior to break-in or maintenance E81 Wear chemically resistant gloves (tested to type EN374) in combination with 'basic' employee training PPE16
Storage CS67	Store substance within a closed system. E84
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 2 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.6e4
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	1.6e4
Maximum daily site tonnage (kg/day)	5.2e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.01
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-5
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

Risk from environmental exposure is driven by freshwater sediment [TCR1b]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	52.8
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1]. Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	4.2e5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable regulations [ERW1].	
Additional information on the basis for the allocation of the indentified OCs and RMMs is contained in PETRORISK file.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. G22. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. G32. Available hazard data do not support the need for a DNEL to be established for other health effects. G36. Risk Management Measures are based on qualitative risk characterisation. G37.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].	

9.21.2. Exposure Estimation

9.21.2.1. Human Health
See Appendix 2.a and 2.b

9.21.2.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

9.22. Regional Environment Exposure Estimation
See *PETRORISK file* in IUCLID section 13 – "RegionalCSR" worksheet

10. RISK CHARACTERISATION

10.1. Manufacture of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

10.1.1. Human Health
See Appendix 3.a. and 3.b.

10.1.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.2. Use of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Intermediate – Industrial

10.2.1. Human Health
See Appendix 3.a. and 3.b.

10.2.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.3. Distribution of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

10.3.1. Human Health
See Appendix 3.a. and 3.b.

10.3.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.4. Formulation & (Re)packing of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 – Industrial

10.4.1. Human Health
See Appendix 3.a. and 3.b.

10.4.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.5. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Coatings – Industrial

10.5.1. Human Health
See Appendix 3.a. and 3.b.

10.5.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.6. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Coatings – Professional

10.6.1. Human Health
See Appendix 3.a. and 3.b.

10.6.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.7. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Oil and Gas Field Drilling and Production Operations – Industrial

10.7.1. Human Health
See Appendix 3.a. and 3.b.

10.7.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.8. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Oil and Gas Field Drilling and Production Operations – Professional

10.8.1. Human Health
See Appendix 3.a. and 3.b.

10.8.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.9. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Lubricants – Industrial

10.9.1. Human Health
See Appendix 3.a. and 3.b.

10.9.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.10. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 Lubricants – Professional: Low Environmental Release

10.10.1. Human Health
See Appendix 3.a. and 3.b.

10.10.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.11. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Lubricants – Professional: High

Environmental Release

10.11.1. Human Health
See Appendix 3.a. and 3.b.

10.11.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.12. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Metal Working Fluids/Rolling Oils – Industrial

10.12.1. Human Health
See Appendix 3.a. and 3.b.

10.12.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.13. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Release Agents or Binders – Industrial

10.13.1. Human Health
See Appendix 3.a. and 3.b.

10.13.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.14. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Release Agents or Binders – Professional

10.14.1. Human Health
See Appendix 3.a. and 3.b.

10.14.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.15. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Industrial

10.15.1. Human Health
See Appendix 3.a. and 3.b.

10.15.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.16. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Professional

10.16.1. Human Health
See Appendix 3.a. and 3.b.

10.16.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.17. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as a Fuel – Consumer

10.17.1. Human Health
See Appendix 3.c.

10.17.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.18. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 as Functional Fluids – Industrial

10.18.1. Human Health
See Appendix 3.a. and 3.b.

10.18.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.19. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Road and Construction Applications – Professional

10.19.1. Human Health
See Appendix 3.a. and 3.b.

10.19.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.20. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Explosives Manufacture and Use – Professional

10.20.1. Human Health
See Appendix 3.a. and 3.b.

10.20.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.21. Uses of Gas Oils (vacuum, hydrocracked & distillate fuels) R20, R38, R40, R65, R51/53 in Rubber Production and Processing – Industrial

10.21.1. Human Health

See Appendix 3.a. and 3.b.

10.21.2. Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

10.22. Overall exposure (combined for all relevant emission/release sources)

10.22.1. Human health (combined for all exposure routes)
See Appendix 3a, 3b & 3c.

10.22.2. Environment (combined for all exposure routes)
Combined exposures can be calculated with information provided on the individual exposure scenarios presented in section 9. However, it is unclear how to define risk management measures resulting from this analysis.

10.23. Regional Environment
See PETRORISK file in IUCLID section 13 – "LocalCSR" worksheet

Appendix 2.b. Qualitative Exposure Estimation

Qualitative Exposure Estimation for R20 substances

There is a difference of at least a factor of 30 between the short-term (when expressed over 15 minutes) and the long term DNELs (when expressed over 8 hours)), i.e. the long-term DNEL is lower by at least 30x. In these circumstances a quantitative assessment of short-term exposure assessment has not be undertaken based on the following rationale:

- For any single short term (ST) event to adversely influence the implementation of the long term (LT) reference value (DNEL when available) in the CSA, then the single ST exposure must be ~30x greater than the LT DNEL. Where the ST exposure might be repeated during the course of an activity, then the contribution made by the ST exposures to the LT average would clearly be greater. Hence, provided daily average exposures are controlled to within the LT reference value, then this will also account for any potential risks arising from ST exposure.

Qualitative Exposure Estimation for R38 substances

This general qualitative CSA approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance. Exposures should be controlled to at least the levels that represent an acceptable level of risk, i.e. implementation of the chosen RMMs will ensure that the likelihood of an event occurring due to the hazard of the substance is negligible, and the risk is considered to be controlled to a level of no concern.

For skin irritation a qualitative risk characterisation was conducted. Handling and storage risk management measures that are generally identified for skin irritation and identified in the Table given in Appendix 3.b.

A review of these RMMs indicates that if the user complies with the following generic statements, risks due to skin irritation can be considered to be adequately controlled:

> E3: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop.

Plus (where there is the potential for additional and significant aerosol exposure, e.g. associated with PROCs 7, 11, 17 or 18):

> E4: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

Qualitative Exposure Estimation for R65 substances

'Aspiration' means the entry of a liquid substance directly into the trachea and lower respiratory tract. Aspiration of hydrocarbon substances can result in severe acute effects such as chemical pneumonitis, varying degrees of pulmonary injury or death. This property relates to the potential for low viscosity material to spread quickly into the deep lung and cause severe pulmonary tissue damage. Classification of a hydrocarbon substance for aspiration hazard is made on the basis of reliable human evidence or on the basis of physical properties.

The R65 risk phrase (Harmful: may cause lung damage if swallowed) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived. This general qualitative CSA approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance. Exposures should be controlled to at least the levels that represent an acceptable level of risk such that the implementation of the chosen RMMs will ensure that the likelihood of an event occurring due to the substance hazard is negligible, and the risk is considered to be controlled to a level of no concern.

There are no routine anticipated exposures by ingestion related to any supported uses of the

substance. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific risk. For any substance, classified as R65, these measures should be communicated via the safety data sheet by use of the following phrase:

- Do not ingest. If swallowed then seek immediate medical assistance.

Furthermore it should be noted that where the substance is sold for use in lamp oils and grill lighters by the general public (Consumers), then these must be visibly, legibly and indelibly marked as follows, in accordance with REACH Annex XVII update of 1.4.2010:

- Keep lamps filled with this liquid out of the reach of children.

- Just a sip of lamp oil – or even sucking the wick of lamps may lead to life threatening lung damage.

Appendix 3.b. Qualitative Risk Characterisation

Qualitative Risk Characterisation for R20 substances

A quantitative assessment of short term exposure has not been undertaken as there is a difference of at least a factor of 30 between the short term (when expressed over 15 minutes) and the long term DNEL (when expressed over 8 hours) DNELs.

Qualitative Risk Characterisation for R38 substances

The implementation of relevant RMMs will ensure that the likelihood of an event occurring due to the substance hazard of skin irritation is negligible and the risk is considered to be controlled to a level of no concern.

For the skin irritation (R38) hazard a qualitative risk characterisation has been conducted consistent with the considerations and risk management measures identified in the Table below.

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
Skin Irritation (R38)	• Liquid	R38 / H315	• S24: Avoid contact with skin Prevention: • P264: Wash ... thoroughly after handling. • P280: Wear protective gloves. Response: • P280: Wear protective gloves/protective clothing/eye protection/face protection. • P302 + P352: IF ON SKIN: Wash with plenty of soap and water. • P321: Specific treatment (see ... on this label). • P332 + P313: If skin irritation occurs: Get medical advice/attenti	• Implementation of basic standards of occupational hygiene; • Avoid direct skin contact with product; • Wear gloves (tested to EN374) if direct hand contact with the substance is likely; wash off skin contamination immediately; • Avoid splashes and spills; • Avoidance of contact with contaminated tools and objects; • Clean up contamination/spills as soon as they occur; • Regular cleaning of equipment and work area; • Ensure suitable management/supervision is in place to check that the RMMs in place are being used correctly and OCs followed; • Train staff on good practice to prevent / minimise exposures and to report any skin problems that may develop; • Adopt good standards of personal skin hygiene. • Where activities may lead to aerosol release e.g. spraying, then additional skin protection measures such as impervious suits and face shields may be required.

			on. • P362 : Take off contaminated clothing and wash before re-use	

The outcome of the CSA is displayed within the relevant Exposure Scenarios by the inclusion of the general phrase

E3: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if direct hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop.

Together with (where there is the potential for additional and significant aerosol exposure):

E4: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

Qualitative Risk Characterisation for R65 substances

The implementation of relevant RMMs will ensure that the likelihood of an event occurring due to the aspiration hazard of the substance is negligible and the risk is considered to be controlled to a level of no concern.

For aspiration hazard a qualitative risk characterisation has been conducted consistent with the considerations and risk management measures identified in the Table below.

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
Aspiration Toxicity (R65)	• Liquid	R65 / H304	Response: • (S2): Keep out of the reach of children (for dangerous products sold to the general public must include this safety phrase) • S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label • P102: Keep out of reach of children. • P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. • P331: Do NOT induce vomiting. Storage:	**Worker** • Do not ingest • Implementation of basic standards of occupational hygiene • Avoid splashes and spills • Avoidance of contact with contaminated tools and objects • Management/supervision to check that the RMMs in place are being used correctly and OCs followed • Training for staff on good practice • Good standard of personal hygiene **Consumer** Do not ingest For lamp oils and grill lighters, follow the provisions of REACH – Annex XVII, including: - Marketing in black opaque containers not exceeding 1 litre - Labelling with specific safe use instruction

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
			• P405: Store locked up. Disposal: • P501 : Dispose of contents/container to.... in accordance with local/regional/ national/internation al regulations (to be specified)	

For any substance, classified as R65, these risk management measures should be communicated via the safety data sheet by use of the following phrase:

Do not ingest. If swallowed then seek immediate medical assistance.