CHEMICAL SAFETY REPORT

Part B

Low Boiling Point Naphthas (Gasolines)

Prepared by: CONCAWE

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)	Environmental Release Category (ERC)	Specific Environmental Release Category (SpERC)
1	Low boiling point naphtha (Gasoline)	01 – Manufacture of Substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.1.1a	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	1, 4	ESVOC SpERC 1.1.v1
2	Low boiling point naphtha (Gasoline)	01 – Manufacture of Substances (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.1.1b	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	1, 4	ESVOC SpERC 1.1.v1
3	Low boiling point naphtha (Gasoline)	01 – Manufacture of Substances (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene))	Industrial	ES 9.1.1c	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	1, 4	ESVOC SpERC 1.1.v1
4	Low boiling point naphtha (Gasoline)	01 – Manufacture of Substances (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene))	Industrial	ES 9.1.1d	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	1, 4	ESVOC SpERC 1.1.v1

5	Low boiling point naphtha (Gasoline)	01b – Use of substance as intermediate (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.2.1a	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	6a	ESVOC SpERC 6.1a.v1
6	Low boiling point naphtha (Gasoline)	01b – Use of substance as intermediate (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.2.1b	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	6a	ESVOC SpERC 6.1a.v1
7	Low boiling point naphtha (Gasoline)	01b – Use of substance as intermediate (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene))	Industrial	ES 9.2.1c	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	6a	ESVOC SpERC 6.1a.v1
8	Low boiling point naphtha (Gasoline)	01b – Use of substance as intermediate (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene))	Industrial	ES 9.2.1d	3, 8, 9	NA	1, 2, 3, 8a, 8b, 15	6a	ESVOC SpERC 6.1a.v1
9	Low boiling point naphtha (Gasoline)	01a – Distribution of substance (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.3.1a	3	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
10	Low boiling point naphtha (Gasoline)	01a – Distribution of substance (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.3.1b	3	NA	1, 2, 3, 8a, 8b, 15	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1

11	Low boiling point naphtha (Gasoline)	01a – Distribution of substance (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene))	Industrial	ES 9.3.1c	3	NA	1, 2, 3, 8a, 8b, 15	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
12	Low boiling point naphtha (Gasoline)	01a – Distribution of substance (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene))	Industrial	ES 9.3.1d	3	NA	1, 2, 3, 8a, 8b, 15	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
13	Low boiling point naphtha (Gasoline)	02 – Formulation & (re)packing of substances and mixtures (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.4.1a	3, 10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	ESVOC SpERC 2.2.v1
14	Low boiling point naphtha (Gasoline)	02 – Formulation & (re)packing of substances and mixtures (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.4.1b	3, 10	NA	1, 2, 3, 8a, 8b, 15	2	ESVOC SpERC 2.2.v1
15	Low boiling point naphtha (Gasoline)	02 – Formulation & (re)packing of substances and mixtures (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene))	Industrial	ES 9.4.1c	3, 10	NA	1, 2, 3, 8a, 8b, 15	2	ESVOC SpERC 2.2.v1

16	Low boiling point naphtha (Gasoline)	02 – Formulation & (re)packing of substances and mixtures (classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene))	Industrial	ES 9.4.1d	3, 10	NA	1, 2, 3, 8a, 8b, 15	2	ESVOC SpERC 2.2.v1
17	Low boiling point naphtha (Gasoline)	03a – Uses in Coatings: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.5.1a	3	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15	4	ESVOC SpERC 4.3a.v1
18	Low boiling point naphtha (Gasoline)	03a – Uses in Coatings: Industrial (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.5.1b	3	NA	1, 2, 3, 8a, 8b, 15	4	ESVOC SpERC 4.3a.v1
19	Low boiling point naphtha (Gasoline)	03b – Uses in Coatings: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Professional	ES 9.6.1	22	NA	1, 2, 3, 4, 5, 8a, 8b, 10, 11, 13, 15, 19	8a, 8d	ESVOC SpERC 8.3b.v1
20	Low boiling point naphtha (Gasoline)	04a – Use in Cleaning Agents: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.7.1a	3	NA	1, 2, 3, 4, 7, 8a, 8b, 10, 13	4	ESVOC SpERC 4.4a.v1
21	Low boiling point naphtha (Gasoline)	04a – Use in Cleaning Agents: Industrial (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.7.1b	3	NA	1, 2, 3, 8a, 8b	4	ESVOC SpERC 4.4a.v1

22	Low boiling point naphtha (Gasoline)	04b – Use in Cleaning Agents: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Professional	ES 9.8.1	22	NA	1, 2, 3, 4, 8a, 8b, 10, 11, 13	8a, 8d	ESVOC SpERC 8.4b.v1
23	Low boiling point naphtha (Gasoline)	04c – Use in Cleaning Agents: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Consumer	ES 9.9.1	21	3, 4, 9a, 24, 35, 38	NA	8a, 8d	ESVOC SpERC 8.4c.v1
24	Low boiling point naphtha (Gasoline)	12a – Use as a fuel: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.10.1a	3	NA	1, 2, 3, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
25	Low boiling point naphtha (Gasoline)	12a – Use as a fuel: Industrial (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.10.1b	3	NA	1, 2, 3, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
26	Low boiling point naphtha (Gasoline)	12b – Use as a fuel: Professional (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Professional	ES 9.11.1a	22	NA	1, 2, 3, 8a, 8b, 16	9a, 9b	ESVOC SpERC 9.12b.v1
27	Low boiling point naphtha (Gasoline)	12b – Use as a fuel: Professional (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Professional	ES 9.11.1b	22	NA	1, 2, 3, 8a, 8b, 16	9a, 9b	ESVOC SpERC 9.12b.v1

28	Low boiling point naphtha (Gasoline)	12c – Use as a fuel: Consumer (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Consumer	ES 9.12.1a	21	13	NA	9a, 9b	ESVOC SpERC 9.12c.v1
29	Low boiling point naphtha (Gasoline)	12c – Use as a fuel: Consumer (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Consumer	ES 9.12.1b	21	13	NA	9a, 9b	ESVOC SpERC 9.12c.v1
30	Low boiling point naphtha (Gasoline)	19 – Rubber production and processing: Industrial (NOT classified as R45, R46, R62 or R63; (containing less than 0.1% benzene))	Industrial	ES 9.13.1a	3, 10, 11	NA	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 13, 14, 15, 21	1, 4, 6d	ESVOC SpERC 4.19.v1
31	Low boiling point naphtha (Gasoline)	19 – Rubber production and processing: Industrial (classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene))	Industrial	ES 9.13.1b	3, 10, 11	NA	1, 2, 3, 8a, 8b, 9, 15	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 Low Boiling Point Naphthas (Gasoline) – Industrial

9.1.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
Title	
Manufacture of substances	
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 within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5.
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13.
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2.
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS15 General exposures (closed systems) + CS56 With sample collection.	No other specific measures identified. EI20.
CS16 General exposures (open systems).	Provide extract ventilation to points where emissions occur. E54.
CS29 Mixing operations (closed systems).	No other specific measures identified. EI20.
CS2 Process sampling	No other specific measures identified. EI20.

CS36 Laboratory activities	Handle in a fume cupboard or under extract ventilation. E83.
CS14 Bulk transfers	No other specific measures identified. EI20.
CS8 Drum/batch transfers	No other specific measures identified. EI20.
CS5 Equipment maintenance	No other specific measures identified. EI20.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.032
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)	0.05
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. Onsite wastewater treatment required [TCR13].	
Treat air emission to provide a typical removal efficiency of (%)	99.0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	95.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	80.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	99.1
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.0e6
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 [ETW4].	

Conditions and measures related to external recovery of waste
During manufacturing no waste of the substance is generated [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) [DSU4]. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file in IUCLID section 13 – “Site-Specific Production” worksheet [DSU6]. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific safety assessment is required [DSU8]. Measured data have been used to demonstrate that the PETRORISK predicted fence-line concentrations in air are overestimated. These data support the conclusion that no refineries have RCRs>1 (Appendix 4 and PETRORISK file in IUCLID section 13 – "Site-Specific Production & Tier II worksheets")

9.1.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Manufacture of substances	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems). + CS54 Continuous process.	Handle substance within a closed system. E47.
CS15 General exposures (closed systems). + CS55 Batch process.	Handle substance within a closed system. E47. Ensure operation is undertaken outdoors. E69.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.

CS67 Storage.	Ensure operation is undertaken outdoors. E69. 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 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.03
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)	0.05
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. Onsite wastewater treatment required [TCR13].	
Treat air emission to provide a typical removal efficiency of (%)	99.0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	95.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	80.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	99.1
Maximum allowable site tonnage (M_{Safe})	2.0e6
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 [ETW4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated [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) [DSU4]. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file in IUCLID section 13 – “Site-Specific Production” worksheet [DSU6]. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8]. Measured data have been used to demonstrate that the PETRORISK predicted fence-line concentrations in air are overestimated. These data support the conclusion that no refineries have RCRs>1 (Appendix 4 and PETRORISK file in IUCLID section 13 – "Tier II worksheet").

9.1.1c. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)	
Title	
Manufacture of substances	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance	Covers percentage substance in the product up to 100 % (unless stated

in product	differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18.
CS67 Storage.	Store substance within a closed system. E84. Wear suitable gloves tested to EN374. PPE15.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.03
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)	0.05
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k] Onsite wastewater treatment required [TCR13].	
Treat air emission to provide a typical removal efficiency of (%)	99.0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	95.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	80.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	99.1
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.0e6
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 [ETW4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated [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) [DSU4]. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file in IUCLID section 13 – “Site-Specific Production” worksheet [DSU6]. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8]. Measured data have been used to demonstrate that the PETRORISK predicted fence-line concentrations in air are overestimated. These data support the conclusion that no refineries have RCRs>1 (Appendix 4 and PETRORISK file in IUCLID section 13 – "Tier II worksheet").

9.1.1d. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)	
Title	
Manufacture of substances	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable

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 (skin irritants). G19.	Avoid all skin contact with product. Clean up contamination / spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3.
General Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system to avoid exposure. E8. Ensure operation is undertaken outdoors. E69. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47. Wear suitable gloves tested to EN374. PPE15. Ensure operation is undertaken outdoors. E69. Avoid carrying out activities involving exposure for more than 4 hours. OC26.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17. Avoid carrying out activities involving exposure for more than 1 hour. OC27.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18. Avoid carrying out activities involving exposure for more than 1 hour. OC27. or, Wear a respirator conforming to EN140 with Type A filter or better. PPE22. Ensure operation is undertaken outdoors. E69.
CS67 Storage.	Wear suitable gloves tested to EN374. PPE15. 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 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.03
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)	0.05
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. Onsite wastewater treatment required [TCR13].	
Treat air emission to provide a required efficiency of (%)	99.0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	95.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	80.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	99.1
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.0e6
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 [ETW4].	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated [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) [DSU4]. Scaled local assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file in IUCLID section 13 – “Site-Specific Production” worksheet [DSU6]. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8]. Measured data have been used to demonstrate that the PETRORISK predicted fence-line concentrations in air are overestimated. These data support the conclusion that no refineries have RCRs>1 (Appendix 4 and PETRORISK file in IUCLID section 13 – " Tier II worksheets").

9.1.2. Exposure Estimation

9.1.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.1.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.1.2.1c. Human Health

See Appendix 2.c. & 2.g.

9.1.2.1d. Human Health

See Appendix 2.d. & 2.g.

9.1.2.2. Environment

See PETRORISK file in IUCLID Section 13 – “LocalCSR” worksheet

9.2. Use of Low Boiling Point Naphthas (Gasoline) as Intermediate – Industrial

9.2.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
Title	
Use of 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 within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS15 General exposures (closed systems) + CS56 With sample collection.	No other specific measures identified. EI20.
CS16 General exposures (open systems).	Provide extract ventilation to points where emissions occur. E54.
CS29 Mixing operations (closed systems).	No other specific measures identified. EI20.
CS2 Process sampling	No other specific measures identified. EI20.

CS36 Laboratory activities	Handle in a fume cupboard or under extract ventilation. E83.
CS14 Bulk transfers	No other specific measures identified. EI20.
CS8 Drum/batch transfers	No other specific measures identified. EI20.
CS5 Equipment maintenance	No other specific measures identified. EI20.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	2.21E6
Fraction of Regional tonnage used locally	0.0068
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)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. 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 (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (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	

This substance is consumed during use and no waste of the substance is generated [ETW5].
Conditions and measures related to external recovery of waste
This substance is consumed during use and no waste of the substance is generated [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].

9.2.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Use of substance as intermediate	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 (not related to strictly controlled conditions) within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance	Covers percentage substance in the product up to 100 % (unless stated

in product	differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Handle substance within a closed system. E47. Ensure operation is undertaken outdoors. E69.
CS67 Storage.	Ensure operation is undertaken outdoors. E69. Store substance within a closed system. E84.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	2.21E6
Fraction of Regional tonnage used locally	0.0068
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)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. 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 (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (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	
This substance is consumed during use and no waste of the substance is generated [ETW5].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated [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].

9.2.1c. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)	
Title	
Use of substance as intermediate	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 (not related to strictly controlled conditions) within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47.
CS67 Storage.	Wear suitable gloves tested to EN374. PPE15. Store substance within a closed system. E84.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18.

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	2.21E6
Fraction of Regional tonnage used locally	0.0068
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)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. 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 (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (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	
This substance is consumed during use and no waste of the substance is generated [ETW5].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated [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].

9.2.1d. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)	
Title	
Use of substance as intermediate	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 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 (not related to strictly controlled conditions) within closed or contained systems. Includes incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (skin irritants). G19.	Avoid all skin contact with product. Clean up contamination / spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3.
General Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance.

	Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15. Ensure operation is undertaken outdoors. E69.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47. Wear suitable gloves tested to EN374. PPE15. Ensure operation is undertaken outdoors. E69. Avoid carrying out activities involving exposure for more than 4 hours. OC26.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17. Avoid carrying out activities involving exposure for more than 1 hour. OC27.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18. Avoid carrying out activities involving exposure for more than 1 hour. OC27. or, Wear a respirator conforming to EN140 with Type A filter or better. PPE22. Ensure operation is undertaken outdoors. E69.
CS67 Storage.	Wear suitable gloves tested to EN374. PPE15. 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 1 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)	2.21E6
Fraction of Regional tonnage used locally	0.0068
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)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. 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 (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
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	
This substance is consumed during use and no waste of the substance is generated [ETW5].	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated [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

9.2.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.2.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.2.2.1c. Human Health

See Appendix 2.c. & 2.g.

9.2.2.1d. Human Health

See Appendix 2.d. & 2.g.

9.2.2.2. Environment

See PETRORISK file in IUCLID Section 13 – “LocalCSR” worksheet

9.3. Distribution of Low Boiling Point Naphthas (Gasoline) – Industrial

9.3.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS15 General exposures (closed systems). + CS56 With sample collection.	No other specific measures identified. EI20.
CS16 General exposures (open systems).	Provide extract ventilation to points where emissions occur. E54.
CS2 Process sampling	No other specific measures identified. EI20.
CS36 Laboratory activities.	Handle in a fume cupboard or under extract ventilation. E83.
CS501 Bulk closed loading and unloading.	No other specific measures identified. EI20.

CS6 Drum and small package filling	Fill containers/cans at dedicated fill points supplied with local extract ventilation. E51.
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	3.75E4
Maximum daily site tonnage (kg/day)	1.2E5
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)	0.001
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 inhalation) [TCR1k]. 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 ≥ (%)	12
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.1E6
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	

External recovery and recycling of waste should comply with applicable local and/or national 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].

9.3.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 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) of substance within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable

Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems). OC9 Outdoor.	Handle substance within closed systems. E47.
CS2 Process sampling	Sample via a closed loop or other system to avoid exposure. E8.
CS36 Laboratory activities.	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS501 Bulk closed loading and unloading.	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.
CS67 Storage.	Ensure operation is undertaken outdoors. E69. 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 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	3.75E4
Maximum daily site tonnage (kg/day)	1.2E5
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)	0.001
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 inhalation) [TCR1k]. 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 ≥ (%)	12
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.1E6
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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 enable the derivation of a DNEL for carcinogenic effects. G33. 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].

9.3.1c. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)	
Title	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 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) of substance within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47.
CS2 Process sampling	Sample via a closed loop or other system to avoid exposure. E8.
CS36 Laboratory activities.	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS501 Bulk closed loading and unloading.	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18.
CS67 Storage.	Ensure operation is undertaken outdoors. E69. 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 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	3.75E4
Maximum daily site tonnage (kg/day)	1.2E5
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)	0.001
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 inhalation) [TCR1k]. 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 ≥ (%)	12
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.1E6
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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].

9.3.1d. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)	
Title	
Distribution of substance	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 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) of substance within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (skin irritants). G19.	Avoid all skin contact with product. Clean up contamination / spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3.
General Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance.

	Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47. Wear suitable gloves tested to EN374. PPE15. Avoid carrying out activities involving exposure for more than 4 hours. OC28.
CS2 Process sampling	Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS36 Laboratory activities.	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12..
CS500 Bulk closed loading.	Ensure material transfers are under containment or extract ventilation. E66. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17. Avoid carrying out activities involving exposure for more than 1 hour. OC27.
CS501 Bulk closed loading and unloading.	Ensure material transfers are under containment or extract ventilation. E66. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. PPE17. Avoid carrying out activities involving exposure for more than 1 hour. OC27.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18. Avoid carrying out activities involving exposure for more than 1 hour. OC27. or, Wear a respirator conforming to EN140 with Type A filter or better. PPE22. Ensure operation is undertaken outdoors. E69.
CS67 Storage.	Wear suitable gloves tested to EN374. PPE15. 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 1 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)	1.87E7
Fraction of Regional tonnage used locally	0.002
Annual site tonnage (tonnes/year)	3.75E4
Maximum daily site tonnage (kg/day)	1.2E5

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)	0.001
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 inhalation) [TCR1k]. 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 ≥ (%)	12
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.1E6
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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

9.3.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.3.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.3.2.1c. Human Health

See Appendix 2.c. & 2.g.

9.3.2.1d. Human Health

See Appendix 2.d. & 2.g.

9.3.2.2. Environment

See PETRORISK file in IUCLID Section 13 – “LocalCSR” worksheet

9.4. Formulation & (re)packing of Low Boiling Point Naphthas (Gasoline) – Industrial

9.4.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS15 General exposures (closed systems). + CS56 With sample collection.	No other specific measures identified. EI20.
CS16 General exposures (open systems).	Provide extract ventilation to points where emissions occur. E54.
CS2 Process sampling	No other specific measures identified. EI20.
CS29 Mixing operations (closed systems)	Provide extract ventilation to points where emissions occur. E54.
CS36 Laboratory activities	Handle in a fume cupboard or under extract ventilation. E83.

CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS34 Manual + CS22 Transfer from/pouring from containers	Ensure material transfers are under containment or extract ventilation. E66.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS6 Drum and small package filling	Fill containers/cans at dedicated fill points supplied with local extract ventilation. E51.
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI18.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.65e7
Fraction of Regional tonnage used locally	0.0018
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 (initial release prior to RMM)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.002
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14].Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	56.5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	94.7
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5

Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.0E5
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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].	

9.4.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 8a, 8b, 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 of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems). OC9 Outdoor	Handle substance within a closed system. E47.
CS2 Process sampling	Sample via a closed loop or other system intended to avoid exposure. E8.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with

	'basic' employee training. PPE16.
CS67 Storage.	Store substance within a closed system. E84. Wear suitable gloves tested to EN374. PPE15.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.65e7
Fraction of Regional tonnage used locally	0.0018
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 (initial release prior to RMM)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.002
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14].Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	56.5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	94.7
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.0E5
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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].

9.4.1c. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)	
Title	
Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 8a, 8b, 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 of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2

Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47.
CS2 Process sampling	Sample via a closed loop or other system intended to avoid exposure. E8.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18.
CS67 Storage.	Store substance within a closed system. E84. Wear suitable gloves tested to EN374. PPE15.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.65e7
Fraction of Regional tonnage used locally	0.0018
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 (initial release prior to RMM)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.002
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	56.5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	94.7
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.0E5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment 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 local and/or national 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].

9.4.1d. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)	
Title	
Formulation & (re)packing of substances and mixtures	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 8a, 8b, 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 of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (skin irritants). G19.	Avoid all skin contact with product. Clean up contamination / spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. E3.
General Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15. Avoid carrying out activities involving exposure for more than 4 hours. OC28.
CS15 General exposures (closed systems).	Provide extract ventilation to points where emissions occur. E54. Handle substance within closed systems. E47. Wear suitable gloves tested to EN374. PPE15. Avoid carrying out activities involving exposure for more than 4 hours. OC28. Ensure operation is undertaken outdoors. E69.
CS67 Storage.	Wear suitable gloves tested to EN374. PPE15. Store substance within a closed system. E84. Avoid carrying out activities involving exposure for more than 4 hours. OC28.
CS2 Process sampling	Handle substance within closed systems. E47. Sample via a closed loop or other system intended to avoid exposure. E8. Wear suitable gloves tested to EN374. PPE15. Avoid carrying out activities involving exposure for more than 4 hours. OC28.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66. Wear suitable gloves tested to EN374. PPE15.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66. Wear suitable gloves tested to EN374. PPE15.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18. Avoid carrying out activities involving exposure for more than 1 hour. OC27. or, Wear a respirator conforming to EN140 with Type A filter or better. PPE22.

	Ensure operation is undertaken outdoors. E69.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.65e7
Fraction of Regional tonnage used locally	0.0018
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 (initial release prior to RMM)	0.025
Release fraction to wastewater from process (initial release prior to RMM)	0.002
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a required efficiency of (%)	56.5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	94.7
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d)	1.0E5
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment 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 local and/or national 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

9.4.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.4.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.4.2.1c. Human Health

See Appendix 2.c. & 2.g.

9.4.2.1d. Human Health

See Appendix 2.d. & 2.g.

9.4.2.2. Environment

See PETRORISK file in IUCLID Section 13 – “LocalCSR” worksheet

9.5. Use of Low Boiling Point Naphthas (Gasoline) in Coatings – Industrial

9.5.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS15 General exposures (closed systems) + CS56 With sample collection.	Provide extract ventilation to points where emissions occur. E54.
CS99 Film formation - force drying, stoving and other	Provide extract ventilation to points where emissions occur. E54.

technologies.	
CS95 Film formation - air drying.	No other specific measures identified. EI20.
CS96. Preparation of material for application. CS30. Mixing operations (open systems).	Provide extract ventilation to points where emissions occur. E54.
CS24 Spraying/fogging by manual application.	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS97 Spraying (automatic/robotic)	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS3 Material transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS98 Roller, spreader, flow application	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings. E60.
CS4 Dipping, immersion and pouring	Use ventilation to extract vapours from freshly coated articles/objects. E56.
CS36 Laboratory activities.	Handle in a fume cupboard or under extract ventilation. E83.
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	6.2E3
Fraction of Regional tonnage used locally	1.0
Annual site tonnage (tonnes/year)	6.2E3
Maximum daily site tonnage (kg/day)	2.1E4
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)	0.007
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	94.1
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0

Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.1E4
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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-libaries.html) [DSU4].	

9.5.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Uses in Coatings	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8a, 8b, 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) within closed or contained systems including incidental exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application activities 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS99 Film formation - force drying, stoving and other technologies.	Provide extract ventilation to points where emissions occur. E54.
CS15 General exposures (closed systems).	Handle substance within a closed system. E47. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
CS3 Material transfers	Ensure material transfers are under containment or extract ventilation. E66.

CS36 Laboratory activities.	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.
CS67 Storage.	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 1 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)	6.2E3
Fraction of Regional tonnage used locally	1.0
Annual site tonnage (tonnes/year)	6.2E3
Maximum daily site tonnage (kg/day)	2.1E4
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)	0.007
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	94.1
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	92.6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.1E4

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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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

9.5.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.5.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.5.2.2. Environment

See PETRORISK file – "LocalCSR" worksheet

9.6. Use of Low Boiling Point Naphthas (Gasoline) in Coatings – Professional

9.6.1. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems). CS38 Use in contained systems.	Ensure material transfers are under containment or extract ventilation. E66.
CS45 Filling / preparation of equipment (from drums or containers).	Use drum pumps or carefully pour from container. E64.

CS95 Film formation - air drying. OC8 Indoor.	No other specific measures identified. EI20.
CS96 Preparation of material for application. CS30 Mixing operations (open systems). CS9 Pouring from small containers. OC8 Indoor.	Provide extract ventilation to points where emissions occur. E54.
CS96 Preparation of material for application. CS30 Mixing operations (open systems). CS9 Pouring from small containers. OC9 Outdoor.	Provide extract ventilation to points where emissions occur. E54.
CS8 Drum / batch transfers.	Ensure material transfers are under containment or extract ventilation. E66.
CS3 Material transfers. CS8 Pumped Drum/batch transfers.	Ensure material transfers are under containment or extract ventilation. E66.
CS98 Roller, spreader, flow application. OC8 Indoor.	Provide enhanced mechanical ventilation by mechanical means. E48.
CS24Spraying/fogging by manual application. OC8 Indoor.	Carry out in a vented booth. E57.
CS4 Dipping, immersion and pouring. OC8 Indoor.	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS36 Laboratory activities	Handle in a fume cupboard or under extract ventilation. E83.
CS72 Hand application - finger-paints, pastels, adhesives. OC8 Indoor.	Provide enhanced mechanical ventilation by mechanical means. E48.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	6.13E3
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	3.1
Maximum daily site tonnage (kg/day)	8.4
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)	0.98
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 inhalation) [TCR1k]. 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 ≥ (%)	3.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	7.8E1
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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. & 2.g.

9.6.2.2 Environment

See PETRORISK file – “LocalCSR” worksheet

9.7. Use of Low Boiling Point Naphthas (Gasoline) in Cleaning Agents – Industrial

9.7.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
Title	
Use in Cleaning Agents	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 7, 8a, 8b, 10, 13 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 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS38 Use in contained systems, CS93 Automated process with (semi) closed systems.	No other specific measures identified. EI20.
CS37 Use in contained batch processes.	No other specific measures identified. EI20.

CS45 Filling / preparation of equipment (from drums or containers).	No other specific measures identified. EI20.
CS44 Cleaning with high pressure washers	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS39 Equipment cleaning and maintenance	No other specific measures identified. EI20.
CS 14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS37 Use in contained batch processes. CS93 Automated process with (semi) closed systems.	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS4 Dipping, immersion and pouring	Minimise exposure by extracted full enclosure for the operation or equipment. E61.
CS42 Cleaning with low-pressure washers.	Provide enhanced general ventilation by mechanical means. E48.
CS34 Manual, CS47 Cleaning, CS48 Surfaces, CS60 No spraying	Provide enhanced general ventilation by mechanical means. E48.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	5.12E2
Fraction of Regional tonnage used locally	0.2
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)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	0.00003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
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 ≥ (%)	4.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.9E4
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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].	

9.7.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Use in Cleaning Agents	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 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	ESVOC SpERC 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products within closed or contained systems including incidental exposures during transfer from storage, mixing/diluting in the preparatory phase and cleaning activities, related equipment cleaning and 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS14 Bulk Transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS38 Use in contained systems, CS93 Automated process with (semi) closed systems.	Handle substance within a closed system. E47. Wear suitable gloves tested to EN374. PPE15.
CS45 Filling / preparation of equipment (from drums or containers).	Ensure material transfers are under containment or extract ventilation. E66.
CS39 Equipment cleaning	Drain down and flush system prior to equipment break-in or maintenance.

and maintenance	E55. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.
CS67 Storage.	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 1 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)	5.12E2
Fraction of Regional tonnage used locally	0.2
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)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	0.00003
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
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 ≥ (%)	4.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	2.9E4
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 local and/or national	

regulations [ETW3].
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national 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].

9.7.2. Exposure Estimation

9.7.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.7.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.7.2.2. Environment

See PETRORISK file – “LocalCSR” worksheet

9.8. Use of Low Boiling Point Naphthas (Gasoline) in cleaning agents – Professional

9.8.1. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
Title	
Use in Cleaning Agents	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 4, 8a, 8b, 10, 11, 13 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 8.4b.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS38 Use in contained systems. CS93 Automated process with (semi) closed systems.	Provide extract ventilation to points where emissions occur. E54.
CS37 Use in contained batch processes.	No other specific measures identified. EI20.
CS45 Filling / preparation of	No other specific measures identified. EI20.

equipment (from drums or containers).	
CS37 Use in contained batch processes, CS76 Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products).	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS45 Filling / preparation of equipment (from drums or containers)	Ensure material transfers are under containment or extract ventilation. E66.
CS14 Bulk Transfers.	Ensure material transfers are under containment or extract ventilation. E66.
CS42 Cleaning with low-pressure washers, CS60 No spraying.	Minimise exposure by extracted full enclosure for the operation or equipment. E61.
CS34 Manual, CS47 Cleaning, CS48 Surfaces, CS50 Wiping, CS51 Rolling, Brushing.	Provide enhanced mechanical ventilation by mechanical means. E48.
CS44 Cleaning with high pressure washers, CS10 Spraying, OC8 Indoor.	Provide enhanced mechanical ventilation by mechanical means. E48.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	3.6E2
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	0.18
Maximum daily site tonnage (kg/day)	0.49
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)	0.02
Release fraction to wastewater from process (initial release prior to RMM)	0.000001
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]. 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	3.3

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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	4.6
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or nation 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].	

9.8.2. Exposure Estimation

9.8.2.1. Human Health

See Appendix 2.a. & 2.g.

9.8.2.2. Environment

See PETRORISK file – “LocalCSR” worksheet

9.9. Use of Low Boiling Point Naphthas (Gasoline) in cleaning agents – Consumer

9.9.1. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)		
Title		
Use in cleaning agents		
Use Descriptor		
Sector(s) of Use	21	
Product Categories	3, 4, 9a, 24, 35, 38 Further information on the mapping and allocation of PC codes is contained in Table 9.1	
Environmental Release Categories	8a 8d	
Specific Environmental Release Category	ESVOC SpERC 8.4c.v1	
Processes, tasks, activities covered		
Covers general exposures to consumers arising from the use of substance in household products sold as washing and cleaning products, aerosols, coatings, lubricants and air care products.		
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 (Pa)	Liquid, vapour pressure > 10 kPa at STP OC5	
Concentration of substance in product	Unless otherwise stated, cover concentrations up to 50% [ConsOC1]	
Amounts used	Unless otherwise stated, covers use amounts up to2760g [ConsOC2]; covers skin contact area up to 857.5cm2 [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 4 times per day [ConsOC4]; covers exposure up to 8 hours per event [ConsOC14]	
Other Operational Conditions affecting exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
Product Category	**Specific Risk Management Measures and Operating Conditions**	
PC3:Air care products--Air care, instant action (aerosol sprays)	OC	Unless otherwise stated, covers concentrations up to 50% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 4 times/day of use[ConsOC4]; for each use event, covers use amounts up to 0.1g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.25hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC3:Air care products--Air care, continuous action (solid and liquid)	OC	Unless otherwise stated, covers concentrations up to 10% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 35.70 cm2 [ConsOC5]; for each use event, covers use amounts up to 0.48g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 8.00hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]

PC4_n:Anti-freeze and de-icing products--Washing car window	OC	Unless otherwise stated, covers concentrations up to 1% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 0.5g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.02hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC4_n:Anti-freeze and de-icing products--Pouring into radiator	OC	Unless otherwise stated, covers concentrations up to 10% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 428.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 2000g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.17hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC4_n:Anti-freeze and de-icing products--Lock de-icer	OC	Unless otherwise stated, covers concentrations up to 30% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 214.40 cm2 [ConsOC5]; for each use event, covers use amounts up to 4g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.25hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC9a:Coatings and paints, fillers putties, thinners--Waterborne latex wall paint	OC	Unless otherwise stated, covers concentrations up to 1.5% [ConsOC1]; covers use up to 4 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 428.75 cm2 [ConsOC5]; for each use event, covers use amounts up to 2760g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC9a:Coatings and paints, fillers putties, thinners--Solvent rich, high solid, water borne paint	OC	Unless otherwise stated, covers concentrations up to 8% [ConsOC1]; covers use up to 6 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 428.75 cm2 [ConsOC5]; for each use event, covers use amounts up to 744g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC9a:Coatings and paints, fillers putties, thinners--Aerosol spray can	OC	Unless otherwise stated, covers concentrations up to 10% [ConsOC1]; covers use up to 2 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 215g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.33hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]

PC9a:Coatings and paints, fillers putties, thinners--Removers (paint-, glue-, wall paper-, sealant-remover)	OC	Unless otherwise stated, covers concentrations up to 5% [ConsOC1]; covers use up to 3 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 857.50 cm2 [ConsOC5]; for each use event, covers use amounts up to 491g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC24: Lubricants, greases, and release products--Liquids	OC	Unless otherwise stated, covers concentrations up to 20% [ConsOC1]; covers use up to 4 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 468.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 2200g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.17hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC24: Lubricants, greases, and release products--Pastes	OC	Unless otherwise stated, covers concentrations up to 20% [ConsOC]; covers use up to 10 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 468.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 34g [ConsOC2]; covers use in room size of m3[ConsOC11];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC24: Lubricants, greases, and release products--Sprays	OC	Unless otherwise stated, covers concentrations up to 15% [ConsOC1]; covers use up to 6 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 428.75 cm2 [ConsOC5]; for each use event, covers use amounts up to 73g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.17hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC35:Washing and cleaning products (including solvent based products)--Laundry and dish washing products	OC	Unless otherwise stated, covers concentrations up to 5% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 857.50 cm2 [ConsOC5]; for each use event, covers use amounts up to 15g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.50hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC35:Washing and cleaning products (including solvent based products)--Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	OC	Unless otherwise stated, covers concentrations up to 5% [ConsOC1]; covers use up to 128 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 857.50 cm2 [ConsOC5]; for each use event, covers use amounts up to 27g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.33hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC35:Washing and cleaning products	OC	Unless otherwise stated, covers concentrations up to 15% [ConsOC1]; covers use up to 128 days/year[ConsOC3]; covers

(including solvent based products)--Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)		use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 428.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 35g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.17hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
PC38_n: Welding and soldering products, flux products--NOTE, n_assessment not in TRA	OC	Unless otherwise stated, covers concentrations up to 20% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 12g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 1.00hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated [ConsRMM15]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)		8.54E2
Fraction of Regional tonnage used locally		0.0005
Annual site tonnage (tonnes/year)		0.43
Maximum daily site tonnage (kg/day)		1.2
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)		0.95
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
Conditions and measures related to municipal sewage treatment plant		
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [STP71k].		
Estimated substance removal from wastewater via domestic sewage treatment (%)		95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)		11
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 local and/or national regulations [ETW3].		
Conditions and measures related to external recovery of waste		
External recovery and recycling of waste should comply with applicable local and/or national 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 applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. 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
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]. 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.e. & 2.g.

9.9.2.2. Environment

See PETRORISK file – “LocalCSR” worksheet

9.10. Use of Low Boiling Point Naphthas (Gasoline) as a fuel – Industrial

9.10.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No specific measures identified. EI18.
CS502 Bulk closed unloading	No specific measures identified. EI18.
CS8 Drum/batch transfers	No specific measures identified. EI18.
CS507 Refuelling	No specific measures identified. EI18.
CS508 Refuelling aircraft	Ensure material transfers are under containment or extract ventilation. E66.
GEST_12I Use as a fuel,	No specific measures identified. EI18.

CS107 (closed systems)	
CS5 Equipment maintenance	No other specific measures identified. EI20.
CS67 Storage.	No specific measures identified. EI18.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.4E6
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	1.4E6
Maximum daily site tonnage (kg/day)	4.6E6
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)	0.0025
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 humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	99.4
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	76.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	4.6E6
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	
This substance is consumed during use and no waste of the substance is generated [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].

9.10.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
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) within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2

Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS502 Bulk closed unloading	Ensure material transfers are under containment or extract ventilation. E66.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. E66.
CS508 Refuelling aircraft	Ensure material transfers are under containment or extract ventilation. E66.
CS15 General exposures (closed systems)	Handle substance within a closed system. E47. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
GEST_12I Use as a fuel, CS107 (closed systems)	Handle substance within closed systems. E47.
CS39 Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. E65. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. PPE16.
CS67 Storage	Store substance within a closed system. E84. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
Additional information on the basis for the allocation of the identified OCs and RMMs is	

contained in Appendices 1 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)	1.4E6
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	1.4E6
Maximum daily site tonnage (kg/day)	4.6E6
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)	0.0025
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 humans via indirect exposure (primarily inhalation) [TCR1k]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	99.4
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	76.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	4.6E6
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	
This substance is consumed during use and no waste of the substance is generated [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].

9.10.2. Exposure Estimation

9.10.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.10.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.10.2.2. Environment

See PETRORISK file – “LocalCSR” worksheet

9.11. Use of Low Boiling Point Naphthas (Gasoline) as a fuel – Professional

9.11.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS66 Preparation of material for application + CS29 Mixing operations (closed systems).	No other specific measures identified. EI20.
CS502 Bulk closed unloading	No other specific measures identified. EI20.
CS8 Drum/batch transfers	No other specific measures identified. EI20.
CS507 Refuelling	No other specific measures identified. EI20.
GEST_12I Use as a fuel, CS107 (closed systems)	No other specific measures identified. EI20.

CS5 Equipment maintenance	Drain down system prior to equipment break-in or maintenance. E65. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. PPE18.
CS67 Storage	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.19E6
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	5.9E2
Maximum daily site tonnage (kg/day)	1.6E3
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)	0.00001
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 inhalation) [TCR1k]. 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 ≥ (%)	3.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.5E4
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	
This substance is consumed during use and no waste of the substance is generated [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].

9.11.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
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) within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2

Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS15 General exposures (closed systems), OC9 Outdoor.	Handle substance within a closed system. E47.
CS502 Bulk closed unloading	Ensure material transfers are under containment or extract ventilation. E66.
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. E66.
GEST_12I Use as a fuel, CS107 (closed systems)	Handle substance within closed systems. E47.
CS5 Equipment maintenance	Drain down system prior to equipment break-in or maintenance. E65. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1. Ensure operatives are trained to minimise exposures. EI19.
CS67 Storage.	Store substance within a closed system. E84. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	1.19E6
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	5.9E2
Maximum daily site tonnage (kg/day)	1.6E3
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)	0.00001
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 inhalation) [TCR1k]. 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 ≥ (%)	3.4
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	1.5E4
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	
This substance is consumed during use and no waste of the substance is generated [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].

9.11.2. Exposure Estimation

9.11.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.11.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.11.2.2. Environment

See PETRORISK file – “LocalCSR” worksheet

9.12. Use of Low Boiling Point Naphthas (Gasoline) as a fuel – Consumer

9.12.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)		
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 the consumer use of substance in liquid 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 (Pa)	Liquid, vapour pressure > 10 kPa at STP OC5	
Concentration of substance in product	Unless otherwise stated, cover concentrations up to 100% [ConsOC1]	
Amounts used	Unless otherwise stated, covers use amounts up to 37500g [ConsOC2]; covers skin contact area up to 420cm2 [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]	
Other Operational Conditions affecting exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
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
PC13:Fuels--Liquid - subcategories added: Scooter 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 3750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid -	OC	Unless otherwise stated, covers concentrations up to 100%

subcategories added: Garden Equipment - Use		[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
PC13:Fuels--Liquid (subcategories added): Garden Equipment - Refuelling	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]; 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
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)		1.39E7
Fraction of Regional tonnage used locally		0.0005
Annual site tonnage (tonnes/year)		7.0E3
Maximum daily site tonnage (kg/day)		1.9E4
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)		0.00001
Release fraction to soil from process (initial release prior to RMM)		0.00001
Conditions and measures related to municipal sewage treatment plant		
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [STP7k].		
Estimated substance removal from wastewater via domestic sewage treatment (%)		95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)		1.8E5
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		
This substance is consumed during use and no waste of the substance is generated [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 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 applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. 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
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]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html) [DSU4].

9.12.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)		
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 the consumer use of substance in liquid 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 (Pa)	Liquid, vapour pressure > 10 kPa at STP OC5	
Concentration of substance in product	Unless otherwise stated, cover concentrations up to 100% [ConsOC1]	
Amounts used	Unless otherwise stated, covers use amounts up to37500g [ConsOC2]; covers skin contact area up to 420cm2 [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]	
Other Operational Conditions affecting exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
Product Category	**Specific Risk Management Measures and Operating Conditions**	
PC13:Fuels--Liquid - subcategories added: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [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
PC13:Fuels--Liquid - subcategories added: Scooter Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [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 3750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - subcategories added: Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 1% [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
PC13:Fuels--Liquid (subcategories added): Garden Equipment - Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [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]; 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
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)		1.39E7
Fraction of Regional tonnage used locally		0.0005
Annual site tonnage (tonnes/year)		7.0E3
Maximum daily site tonnage (kg/day)		1.9E4
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)		0.00001
Release fraction to soil from process (initial release prior to RMM)		0.00001
Conditions and measures related to municipal sewage treatment plant		
Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [STP7k].		
Estimated substance removal from wastewater via domestic sewage treatment (%)		95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)		1.8E5
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		
This substance is consumed during use and no waste of the substance is generated [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 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 applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. 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
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]. 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

9.12.2.1a. Human Health

See Appendix 2.e. & 2.g.

9.12.2.1b. Human Health

See Appendix 2.f. & 2.g.

9.12.2.2. Environment

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

9.13. Use of Low Boiling Point Naphthas (Gasoline) in Rubber production and processing – Industrial

9.13.1a. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)	
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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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
CS15 General exposures (closed systems).	No other specific measures identified. EI20.
CS3 Material transfers	Ensure material transfers are under containment or extract ventilation. E66.
CS91 Bulk weighing	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS90 Small scale weighing	Carry out in a vented booth. E57.

CS92 Additive premixing	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS64 Calendaring (including Banburys)	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS73 Pressing uncured rubber blanks	Provide extract ventilation to points where emissions occur. E54.
CS112 Rubber refreshing during article build up	Provide extract ventilation to points where emissions occur. E54.
CS70 Vulcanisation	Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
CS71 Cooling cured articles	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS13 Manual applications e.g. brushing, rolling	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS113 Production of articles by dipping	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. E60.
CS102 Finishing operations	No other specific measures identified. EI20.
CS36 Laboratory activities	Handle in a fume cupboard or under extract ventilation. E83.
CS5 Equipment maintenance	No other specific measures identified. EI20.
CS67 Storage.	No other specific measures identified. EI20.
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 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)	94
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	94
Maximum daily site tonnage (kg/day)	4.7E3
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)	0.003
Release fraction to wastewater from process (initial release prior to RMM)	0.01
Release fraction to soil from process (initial release prior to RMM)	0.0001
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. 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 ≥ (%)	23.9
If discharging to domestic sewage treatment plant, provide the required	0

onsite wastewater removal efficiency of ≥ (%)	
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 (%)	95.5
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	4.2E4
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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].	

9.13.1b. Exposure Scenario

Section 1 Exposure Scenario Title Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)	
Title	
Rubber production and processing	
Use Descriptor	
Sector(s) of Use	3, 10, 11
Process Categories	1, 2, 3, 8a, 8b, 9, 15 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 19
Processes, tasks, activities covered	
Manufacture of tyres and general rubber articles within closed or contained systems, including incidental exposures during 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 > 10 kPa at STP OC5
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) G13
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) G2
Human factors not influenced by risk management	Not applicable
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 (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 Measures (carcinogens). G18.	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.
CS3 Material transfers CS107 Storage and bulk transfers of rubber chemicals to/from storage	Store substance within a closed system. E84. Ensure material transfers are under containment or extract ventilation. E66.
CS15 General exposures (closed systems).	Handle substance within a closed system. E47.
CS3 Material transfers	Ensure material transfers are under containment or extract ventilation. E66.

CS91 Bulk weighing	Handle substance within a closed system. E47. Wear suitable gloves tested to EN374. PPE15.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS5 Equipment maintenance	Drain down system prior to equipment break-in or maintenance. E65. Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. E1.
CS90 Small scale weighing	Carry out in a vented booth or extracted enclosure. E57.
CS67 Storage. OC9 Outdoor.	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 1 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)	94
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	94
Maximum daily site tonnage (kg/day)	4.7E3
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)	0.003
Release fraction to wastewater from process (initial release prior to RMM)	0.01
Release fraction to soil from process (initial release prior to RMM)	0.0001
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	
Prevent discharge of undissolved substance to or recover from wastewater [TCR14]. Risk from environmental exposure is driven by humans via indirect exposure (primarily inhalation) [TCR1k]. 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 ≥ (%)	23.9
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
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 (%)	95.5

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	95.5
Maximum allowable site tonnage (M_{Safe}) (kg/d)	4.2E4
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 local and/or national regulations [ETW3].	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national 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

9.13.2.1a. Human Health

See Appendix 2.a. & 2.g.

9.13.2.1b. Human Health

See Appendix 2.b. & 2.g.

9.13.2.2. Environment

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

9.14. Regional Environment Exposure Estimation

See PETRORISK file – “RegionalCSR” worksheet

10. RISK CHARACTERISATION

10.1. Manufacture of Substance – Industrial

10.1.1. Human Health

See Appendix 3.a, 3.b, 3.c, 3.d & 3.g.

10.1.2. Environment

See PETRORISK file in IUCLID section 13 – "Site-Specific Production & Tier II worksheets"

10.2. Use as intermediate – Industrial

10.2.1. Human Health

See Appendix 3.a, 3.b, 3.c, 3.d & 3.g.

10.2.2. Environment

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

10.3. Distribution – Industrial

10.3.1. Human Health

See Appendix 3.a, 3.b, 3.c, 3.d & 3.g.

10.3.2. Environment

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

10.4. Formulation & packing of preparations and mixtures – Industrial

10.4.1. Human Health

See Appendix 3.a, 3.b, 3.c, 3.d & 3.g.

10.4.2. Environment

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

10.5. Uses in Coatings – Industrial

10.5.1. Human Health

See Appendix 3.a, 3.b & 3.g.

10.5.2. Environment

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

10.6. Uses in Coatings – Professional

10.6.1. Human Health

See Appendix 3.a. & 3.g.

10.6.2. Environment

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

10.7. Use in Cleaning Agents – Industrial

10.7.1. Human Health

See Appendix 3.a, 3.b & 3.g.

10.7.2. Environment

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

10.8. Use in Cleaning Agents – Professional

10.8.1. Human Health

See Appendix 3.a. & 3.g.

10.8.2. Environment

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

10.9. Use in Cleaning Agents – Consumer

10.9.1. Human Health

See Appendix 3.e. & 3.g.

10.9.2. Environment

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

10.10. Use as a fuel – Industrial

10.10.1. Human Health

See Appendix 3.a, 3.b. & 3.g.

10.10.2. Environment

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

10.11. Use as a fuel – Professional

10.11.1. Human Health

See Appendix 3.a, 3.b. & 3.g.

10.11.2. Environment

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

10.12. Use as a fuel – Consumer

10.12.1. Human Health

See Appendix 3.e, 3.f. & 3.g.

10.12.2. Environment

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

10.13. Rubber production and processing – Industrial

10.13.1. Human Health

See Appendix 3.a, 3b & 3.g.

10.13.2. Environment

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

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

10.14.1. Human health (combined for all exposure routes)

See Appendix 3.a, 3.b, 3.c, 3.d, 3.e, 3.f & 3.g.

10.14.2. 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.

10.15. Regional Environment

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

APPENDIX 2: Exposure Estimation

Appendix 2.a.

Exposure Estimation - Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)
Worker

Appendix 2.b.

Exposure Estimation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)
Worker

Appendix 2.c.

Exposure Estimation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)
Worker

Appendix 2.d.

Exposure Estimation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)
Worker

Appendix 2.e.

Exposure Estimation – Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)
Consumer

Appendix 2.f.

Exposure Estimation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)
Consumer

Appendix 2.g.

Exposure Estimation – Qualitative Exposure Estimation

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 R45 substances (where applicable)

The R45 risk phrase (may cause cancer) relates to the strength of evidence to indicate that the substance may cause cancer in humans. When a carcinogenic substance is considered a threshold carcinogen and/or if appropriate dose-response data from epidemiological and/or animal studies are available, it may be possible to derive a DMEL which should then be used in quantitative risk characterisation to define the appropriate RMMs... However, when a carcinogenic substance is considered a non-threshold carcinogen and/or if appropriate dose-response data from epidemiological and/or animal studies are not available, it is not possible to derive a DMEL, and hence a qualitative approach to the CSA will be required.

This general qualitative CSA approach aims to reduce/avoid exposure or incidents with the substance consistent with the expectations of Directive 2004/37/EC. The general philosophy is twofold:

1. that the uses of any R45 substance are limited to suitably equipped industrial or professional settings and will only be supported in circumstances where exposure potential is limited (PROCs *1, 2, 3, 8a (maintenance only), 8b, 9, 15, and 16)* and will not cover those situations where exposure to the substance might be expected to be significant (such as PROCs 7, 11, 17, 18, etc). This limitation on use is consistent with the current expectations of Directive 2004/37/EC.

2. That a stringent set of RMMs will be applied. Firstly, exposures should be controlled to at least the levels that represent an acceptable level of risk (i.e. represent a RCR of <1 for the DMEL or the otherwise critical non-carcinogenic adverse effect associated with exposure to the substance (the lowest DNEL is used for a quantitative CSA)). Secondly, that rigorous systems of control are implemented to manage exposures in addition to and independent of the risk measures required to manage non-cancer endpoints (and which are described via the use of standard phrases linked to defined circumstances of use), with the aim that the net outcome is the description of the RMMs that when implemented

ensure that the likelihood of cancer occurring is minimised, and the risk is considered to be controlled.

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: Risk Characterisation

Appendix 3.a.

Risk Characterisation - Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)
Worker

Appendix 3.c.

Risk Characterisation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 1% to 5% benzene)
Worker

Appendix 3.d.

Risk Characterisation - Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing equal to or greater than 5% to 20% benzene)
Worker

Appendix 3.e.

Risk Characterisation – Low boiling point naphthas (Gasoline) that is *NOT* classified as R45, R46, R62 or R63; (containing less than 0.1% benzene)
Consumer

Appendix 3.f.

Risk Characterisation – Low boiling point naphthas (Gasoline) that is classified as R45 and/or R46 and/or R62 and/or R63; (containing 0% to 1% benzene)
Consumer

Appendix 3.g.

Risk Characterisation – Qualitative Risk Characterisation

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/attention. • P362 : Take off	• 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.

			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 R45 substances (where applicable)

In the case of carcinogens (substances classified as R45), comprehensive EU legislation already exists that establishes a framework of expectations that can be used as the basis for applying a qualitative approach for any CSA. Specifically Directive 2004/37/EC of the European Parliament and the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC) sets out the minimum requirements for protecting workers who may be exposed to carcinogens and mutagens during work activities Preventive measures must be taken for the protection of the health and safety of workers exposed to carcinogens or mutagens.The implementation of following RMMs, which build from the existing legal provisions, is intended to ensure that the likelihood of cancer occurring is minimised.

For the cancer 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**
Cancer (R45)	• Liquid	R45 / H350	• S23: Do not breathe gas/fumes/vapour/spray • S24: Avoid contact with skin • S51: Use only in well-ventilated areas • S36/37: Wear suitable protective clothing and gloves. • S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). • S53: Avoid exposure – obtain special instructions before use.	**Worker** • Implement good standards of occupational hygiene • Consider technical advances and process upgrades • Minimise exposure using measures such as closed systems • Management/supervision to check that the RMMs in place are being used correctly and OCs followed • Restrict access to authorised persons; • Provide specific activity training • Regularly inspect, test and maintain all control

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
			Prevention: • P201: Obtain special instructions before use. • P202: Do not handle until all safety precautions have been read and understood. • P260: Do not breathe dust/fume/gas/mist/vapours/spray. • P281: Use personal protective equipment as required. Response: • P308 + P313: If exposed or concerned: Get medical advice/attention. Storage: • P405: Store locked up. Disposal: • P501 : Dispose of contents/container to.... in accordance with local/regional/ national/international regulations (to be specified)	measures • Consider the need for risk based health surveillance **Consumer** - Not supported unless marketed in a manner consistent with Article 56 of REACH

For any substance, classified as R45, these risk management measures will be communicated via the Exposure Scenario by use of the following phrases:

For every exposure scenario, the following general phrase will be included

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. G20.

In addition the following specific phrases will also be applied, where the identified contributing scenarios are relevant within any Exposure Scenario

Contributing Scenarios (examples)	**Risk Management Measures (all included in Exposure Scenarios – for R45 substances)**
CS2 Process sampling	Sample via a closed loop or other system to avoid exposure. E8.

CS14 Bulk transfers (incl. CS501) *And related phrases such as CS6, CS8.*	Ensure material transfers are under containment or extract ventilation. E66.
CS15 General exposures (closed systems) *And related phrases…*	Handle substance within a closed system. E47.
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. E66.
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. E12.
CS5 Equipment maintenance **AND** CS39 Equipment cleaning and maintenance	**Either:** Drain down and flush system prior to equipment break-in or maintenance. E55; **Or;** Drain down system prior to equipment break-in or maintenance. E65. **And;** Retain drain downs in sealed storage pending disposal or for subsequent recycle. ENVT4. Clear spills immediately. C&H13.
CS67 Storage	Store substance within a closed system. E84.

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: • P405: Store locked up.	**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
			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.

APPENDIX 4: REACH Tier 2 Risk Assessment of Low Boiling Point Naphthas (Gasolines): Overview of European Refinery Benzene Monitoring Data

Summary:

Using the prescribed risk assessment models, calculations made for the Risk Assessment of Low Boiling Point Naphthas (Gasolines) in the framework of REACH gave unrealistically high predicted values for concentrations of benzene in the air compartment. To assess the degree of conservatism involved, measured ambient air concentrations of benzene in the vicinity of refineries have been investigated using refinery and national data. No agreement was found between the measured data and the risk assessment concentrations. There is no evidence in the measured data that concentrations exceed the air quality standards intended to protect human health.

1. Introduction

Benzene is a priority substance because of the adverse health effects associated with long term chronic exposure. It is one of several priority substances for which regulatory standards are set for their ambient air quality concentrations. The European Union (and its member states) has a long term objective to reduce ambient benzene concentrations, expressed as annual averages, The current Air Quality Directive (2008/50/EC) requires ambient air concentrations of benzene to be below 5 µg/m^3 by January 1st 2010 having reduced from a maximum of 10 µg/m^3 in July 1999 and decreasing by 1 µg/m^3 per year from 2006. Furthermore the Air Quality Directive requires monitoring of benzene levels wherever they exceed an upper assessment threshold of 3.5 µg/m^3. Lesser monitoring requirements apply where benzene is below the upper threshold but still above a lower threshold of 2.5 µg/m^3. Modelling may be used as an alternative to monitoring subject to verification of methodology. To reflect that the purpose of ambient air quality standards is to protect public health, the number of monitoring stations needed to establish that air quality standards are met is linked to population density. Benzene monitoring is required to be made downwind of industrial sites where populations exceed 249,000 in a declared air quality zone.

Member states may set their own (stricter) tolerance for benzene concentrations. These may alternatively be expressed as Air Quality Objectives which are generally non-binding but carry with them the requirement to monitor in order to demonstrate trends in the reduction of ambient air concentrations.

It is important to note that air quality standards do not apply within refinery boundaries on the grounds that health and safety legislation adequately governs worker exposure for the limited time they are on site.

In the context of REACH risk assessments have been carried out using a screening tool, PETRORISK, that predicts environmental concentrations based on category-specific site tonnages and conservative emission release factors. For the majority of refineries, conservative human exposure estimates derived from PETRORISK have resulted in risk characterisation ratios significantly greater than 1.0. As a result, a refined assessment is required.

It is worth noting that:

- Refinery releases to atmosphere of benzene take place as fugitive or diffuse emissions, where the benzene is a minority component in process and product streams. Benzene *per se* is never released as a channelled emission of pure substance which is the assumption made in the risk assessment.
- The modelled risk factors are so large that the implied environmental concentrations are not considered realistic. For example, the risk characterisation ratio at one site of 8.61 for the benzene component implies a "typical" environmental concentration of 28 µg/m^3 using the risk assessors chosen DMEL of 3.25 µg/m^3 (1 ppb) which is more than 5 times the permitted AQ standard in 2010.

To secure our view of this 'credibility gap", CONCAWE has asked its member companies for information on benzene concentrations obtained via refinery monitoring programmes. Furthermore, an analysis of data from the European AQ monitoring network[10] was also made with focus on measurement stations placed (approximately) 3 km or less[11] from refineries. In remote areas and particularly where the station was separated from the refinery by a water body, over which dispersion is less than overland, this distance was extended to 5 km. The judgement on relative positions of refineries and monitoring stations was made visually using Google Earth, a Google Earth refinery location file and the monitoring station location data provided by the European Environment Agency,

Information on benzene monitoring was provided by 50 refineries following a request for data. The extent of monitoring ranged from continuous measures to short duration surveys. A typical short duration measure is a 2 week diffusion tube sample or a 2 week campaign of daily diffusion tube samples. It is clear from this response that a majority of refineries are actively undertaking risk management measures with respect to Benzene in air.

The time frame in which measurements have been made varied considerably. Generally a short duration campaign (typically between 2 weeks and 2 months duration) was carried out to establish typical concentrations. Such studies started in the mid 1990's. In some refineries results showed low concentrations and no further measurements were made. In other refineries there are periodic monitoring campaigns to verify that the low measured concentrations remain so over a number of years. In other refineries a requirement for detailed monitoring is a condition of the operating permit (either discrete campaigns or continuous monitoring) providing times-series of concentrations.

The purpose of monitoring varies. In some cases the focus is on inspecting likely "hot spots" of benzene by looking at points where the potential for leaks or releases to atmosphere are greatest. Measures here are not spatially representative of either the refinery site (inside the fence) or of concentrations outside the site. In other cases measurements focus on fenceline concentrations in order to understand the maximal impact outside the fence where ambient air quality standards apply. In further cases the measurements extend into the neighbourhood around the site to establish ambient concentrations. These are the most relevant for risk assessment to public health. External measurements may be carried out in collaboration with or by local authorities. This investigation has shown that such data very rarely appear in the European AQ database (Airbase[12]).

2. Overview of air quality data

Short duration measures, especially on the sites themselves can show concentrations above 5 µg/m^3, when made close to process plant, water treatment and loading/unloading facilities. The more complete surveys show that the spatial extent of these areas is very limited and away from the sources, the concentrations on site rapidly fall to fenceline values.

Fenceline surveys generally show concentrations that are (well) below 5 µg/m^3 at any time of year. Where time-series are available, there is a tendency for concentrations to be higher in the winter months than in the summer months. This could be due to differences in meteorological conditions affecting dispersion or changes in refining product slate for the winter months or a combination of these factors. There are however some exceptions to this where summer concentrations are higher.

Measurements outside the fenceline were reported for stations ranging from a few meters to 5 kilometres distance. Generally concentrations were well below 5 µg/m^3. For those cases of elevated levels, it was commented by the investigating national body that traffic contributions were probably significant and possibly accounted for between 20–50% of the measured

[10] Across Europe the ambient air quality standard for benzene is met. As a consequence not all industrial monitoring stations are required to be set up to detect benzene. This reflects a combination of data or (dispersion) model based evidence that concentrations are below the threshold limits for the presence of population at risk.

[11] It is very important to note that refinery sources are only one possible source of atmospheric benzene and the further the monitoring station from the refinery the more likely that other sources, for example road traffic, will dominate.

[12] http://air-climate.eionet.europa.eu/announcements/ann1267782109/databases/airbase

concentrations. The spatial extent of hot spots appears to be of order 400 m diameter maximum based on observations.

The European AQ database holds some information on benzene and, as described above, the AQ Directive requires benzene to be monitored if concentrations near to populated areas are above the lower threshold. The 5 µg/m^3 standard is substantially met[13] throughout Europe but European Environment Agency use a traffic light system to assess compliance which gives no quantitative information. Therefore statistical data on concentrations obtained from Airbase[14] were examined. We chose records from measurement stations sited (approximately) <3 km from refinery sites noting that, although their proximity to refineries makes them useful indicators, it is still possible that other benzene sources would influence their measurements.

The Airbase station results are summarised in Table 1 below. This table is a list of benzene measurements, expressed as annual averages, reported in Airbase. Not all stations that are near to refineries report benzene. A single station may cover more than one refinery in areas where there are several. A refinery may be covered by more than one station. Only 4 data points exceed the 2010 EU standard of 5 µg/m^3. For one station in Belgium the 1997 value is completely different to the data for all other years and seems to be an outlier. In France the 2007 value for one of the stations of 5.7 µg/m^3 just exceeds the 2010 current standard. However in 2008 the reported value for this station is below this standard. In Italy, two 2008 measurements (5.5 and 8.4 µg/m^3) exceed this standard. It should be noted that multiple sources contribute to these concentrations and the neighbouring refinery is not necessarily responsible for the exceedence. Overall the impression of the data is that benzene concentrations are low and have been since detailed monitoring started in the mid 1990's. The typical air concentration for benzene appears to be < 2 µg/m^3.

The mean of the data from stations in Table 1 is 1.95 µg/m^3 and the median is 1.48 µg/m^3. Some 90% of measurements are below 3.34 µg/m^3 and 95% below 4.44 µg/m^3.

Table 1. Annual Average Concentrations from Airbase stations located near (~ 3 km from) refineries.

Country	Station id	Year	Concentration µg/m^3
AT	AT32701	2006	1.00
		2007	0.98
BG	BG0044A	2006	2.56
		2008	4.41
RO	RO0106A	2008	3.57
GB	GB0814A	2002	1.61
		2003	1.69
		2004	1.61
		2005	1.65
		2006	1.74
CZ	CZ0EPAO	2005	1.90
		2006	2.60
		2007	0.57
		2008	1.17
	CZEPAU	2005	0.92
		2006	1.26
		2007	0.98

[13] 2008 data in Airbase

[14] The raw data were not examined. Annual means based on daily averages were used. Data has not been filtered according to completeness (e.g. some values in the table provided are based on partial data).

Country	Station id	Year	Concentration µg/m^3
		2008	1.44
DE	DENW147	2005	4.10
		2006	4.48
	DENW152	2005	1.50
		2006	1.59
	DENW149	2005	1.60
		2006	1.36
	DEBW022	2005	1.20
NL	NL00415	1997	2.48
		1998	1.52
		1999	1.41
		2000	1.29
		2001	1.33
		2002	1.75
		2003	1.68
		2004	1.22
		2005	1.21
		2006	0.98
		2007	1.13
		2008	0.94
BE	BE0457A	1996	3.37
		1997	2.38
		1998	1.66
		1999	1.48
	BEVR833	1994	2.90
		1995	2.44
		1996	2.11
		1997	18.13
		1998	1.46
		1999	1.60
		2000	1.27
		2001	1.08
		2002	1.36
		2003	1.27
		2004	1.17
		2005	1.26
		2006	0.17
		2007	0.14
		2008	1.11
	BETR833	2007	1.23
		2008	1.37
FR	FR20029	2004	6.35
		2005	6.64
		2007	5.78
		2008	2.62

Country	Station id	Year	Concentration µg/m^3
	FR10007	2005	1.51
		2007	1.43
		2008	0.99
ES	ES1279A	2002	2.21
		2003	2.30
		2004	2.48
		2005	2.17
		2006	1.00
		2007	3.23
		2008	3.21
	ES0892A	2004	0.23
		2005	0.37
		2006	0.63
		2007	1.21
		2008	1.48
	ES0893A	2008	2.01
	ES0651A	2005	1.20
		2006	1.40
		2007	1.32
		2008	1.10
	ES1312A	2007	2.28
		2008	1.98
	ES1666A	2005	1.22
		2006	1.17
		2007	1.13
		2008	0.99
	ES0556A	2005	1.55
	ES0556A	2006	1.57
IT	IT1270A	2003	1.90
		2004	1.78
		2005	1.02
		2006	2.86
		2007	3.01
		2008	5.54
	IT1269A	2002	0.69
		2003	1.00
		2004	0.93
		2005	0.65
		2006	1.13
		2007	1.33
		2008	1.59
	IT1373A	2004	1.26
		2005	0.63
		2006	1.30
		2007	1.41

Country	Station id	Year	Concentration µg/m^3
		2008	1.19
	IT12688A	2008	8.44
	IT0461A	2003	3.95
		2004	2.25
		2005	2.03
		2006	2.40
		2007	2.79
		2008	3.46
	IT0462A	2001	1.58
		2008	3.85
	IT0463A	2008	1.58
	IT1153A	2003	2.27
		2004	1.22
		2005	0.75
		2006	0.86
		2007	0.82
		2008	0.82
	IT1611A	2004	1.08
		2005	1.09
		2007	1.52
		2008	1.59
	IT1751A	2007	2.35
		2008	1.48
	IT0612A	2007	1.02
		2008	0.92
	IT1786A	2006	2.06

3. Overview of Refinery Monitoring Data

A summary of the refinery survey data is given in Table 2 below. To preserve anonymity the refineries are only referenced according to their internal CONCAWE codes used in the REACH Risk Assessments for refined hydrocarbon products.

Also shown is the risk characterisation ratio derived from the Low Boiling Point Naphthas (Gasolines) REACH risk assessment and the implied "typical" benzene air concentration. A value of 3.25 µg/m^3 (1 ppb) represents a risk characterisation ratio of one in the risk assessment. A more useful (but almost identical value) of 3.5 µg/m^3 is the upper monitoring threshold under the Air Quality Directive. Results are provided in reverse sorted risk order (highest to lowest) for refineries who replied to the survey request. Refineries provided documented evidence of surveys made or monitoring system results. In some cases reports of (independent) local authority investigations were submitted. In a few cases no data were reported. It was hoped that there might be a correspondence between sites responding to the survey and those covered by the Airbase network but this proved not to be the case so there is not a robust evidence base for comparing refinery monitoring fenceline concentrations with those captured by the AQ network.

For reasons of space the refinery responses have been summarised in terms of their scope and only indicative concentrations have been provided here. The time-frame the measurements apply to is also noted because they span a period from 1995 to 2010. Within this period the EU air quality standard has decreased (10 µg/m^3 through 2005 then decreasing 9 µg/m^3 in 2006, 8 µg/m^3 in 2007, 7 µg/m^3 in 2008, 6 µg/m^3 in 2009 to 5 µg/m^3 in 2010). All responses are filed in a secure data system in CONCAWE.

Table 2 shows that there is a clear disconnect between the concentrations predicted by the Risk Assessment and the measured values. Overall there is a clear indication that fenceline concentrations are overall low and (even allowing for the preponderance of campaign vs. continuous monitoring) consistent with ambient air quality standards being met by a margin of typically a factor 2.

Table 2. Summary of Refinery Monitoring Data.

The RA code is the Reach Assessment code used to denote refinery sites while preserving anonymity.
The RA RCR is the Reach Assessment Risk Characterisation Ratio.
The Implied Concentration is this ratio multiplied by 3.25 µg/m3 (1 ppb) used in its derivation
The Data Concentration is the best judgment of a representative concentration from the monitoring which may not be a true annual average
The Revised RCR is the concentration divided by 3.5 µg/m3which is an EU wide regulatory value for health protection and for required benzene monitoring.
A symbol < means that at least one data point has been reported as less than a value, that maximal value has been used.

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
5.05	8.61	30.13	2.1 (average of the 8 stations closest fenceline)	0.60	Independent Intensive campaign of measurements at 36 locations over 2 weeks to map community values. Estimated non-industrial sources contribute 20-50% of measured concentrations. Multiple industrial sources. Community concentrations (over the 12 weeks) were on average less than the upper reporting threshold of 3.5 µg/m^3 (annual). Hot spot (highest average 18.2 µg/m^3) on access road dividing site.	first quarter 2007
10.02	6.15	21.54			No recent data	1994-1995
13.00	5.87	20.55	1.03 (6 year average)	0.29	Detailed monitoring of boundary and on-site locations. Results consistent over measurement period. Given as average of 8 boundary station measures. Annual results very similar with one year of low concentration means varied 0.19 to 1.56 µg/m^3	2003-2009
13.12	5.57	19.49			no data provided	

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
4.00	4.63	16.21	1 - 4 (1993-1996) 1 -2 (1997-2000)	0.57	Continuous monitoring at downwind station for 1993-1996 within boundary and 1997-2000 outside boundary in direction of prevailing wind. Measurements in discussion with environmental authorities and discontinued in 2000 in the face of evidence that concentrations were well below environmental limits. Values are medians.	1993-2000
23.00	4.31	15.08	4, 6 , < 1., <1.	0.85 Average RCR	4 monitoring stations taking 1/2 hour samples and reporting daily (362 measures in year) average for two stations below 1 µg/m^3. Data precision to 1 significant figure.	2009
2.00	3.75	13.14	3.4 average over all data	0.97	Measurements at 20 locations on site in 2005, 2007 and 2008 including 5 boundary points. Campaigns lasted one month. Average 3.5 µg/m^3 in Sep 2005, 5.2 µg/m^3 in Nov 2006 and 1.6 µg/m^3 in Nov 2008. Overall highest station value was 6.4 µg/m^3 in Nov 2006. All stations showed low concentrations in Nov 2008.	2005,2006,2008 one month only
13.11	3.66	12.82	1.28 (2 week average of all sites)	0.37	Thorough survey conducted for 14 day period once a year. No change in observed concentration in 2 years. Sampling locations cover local community. Highest single reading in 2009 was 4 µg/m^3.	2008 - 2009
13.02	3.62	12.66	2.5	0.71	Local authority monitoring at 2 sites remote from traffic sources since 2004. Little variation all values between 2.03 and 3.25 µg/m^3 annual mean. Average is 2.5 µg/m^3	2004 - 2008
6.26	3.36	11.75	1.5 boundary one month data	0.43	Measurements at 20 locations in Nov 2007 including 8 on external boundary. All concentrations < 1.5 µg/m^3	Nov-07
6.08	3.04	10.66	< 0.3	< 0.08	Benzene concentrations assessed on the basis of dispersion modelling using inventory. Very low concentrations predicted	2006 and 2008
7.00	3.01	10.52	0.83	0.24	Continuous Monitoring . Station location unknown. Year 2010 to date average 0.83 with max 3.42.	2009-2010

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
13.10	2.95	10.33	< 2.9 in any year (average perimeter)	0.83	2 week diffusion tube study carried out every 6 months all around refinery boundary. One non-public "hot spot" less than 400m across where concentrations vary between 4 -11.2 µg/m^3 in the 5 year period	2004 - 2009
24.01	2.95	10.33	1.74 (average of 4 stations over 5 years)	0.50	Permanent Community Monitoring with 4 automatic monitoring sites giving annual averages. Maximum was at the closest site in 2005 and was 2.48 µg/m^3. Yearly concentrations fluctuate about central values of 1.86, 1.86, 1.32 and 1.92 µg/m^3 for the 4 stations respectively.	2005-2009 incl.
5.02	2.88	10.10	3.1 (average of fence and outside measures)	0.89	Measurements for 16 locations both inside and outside the refinery. Duration of monitoring unknown. Average of outside measures 3.2 µg/m^3 with max station 6.6 µg/m^3. Average of fence line measures 3.0 µg/m^3 with max 8.5 µg/m^3.	2004
5.12	2.63	9.20	< 2 boundary one month	< 0.57	Measurement campaign at 20 locations including 7 fence line and one external point. Fence line all < 1.5 µg/m^3 and external 2.0 µg/m^3	Jul-08
12.01	2.48	8.68	< 1 (average concentrations for the year, the 4 month and the 4 x1 month sites)	< 0.29	Thorough survey of refinery environs including a year survey of hourly concentrations downwind of refinery. One month per season at 3 further locations and weekly averages for 4 months at 10 further locations.	2007
6.10	2.47	8.66	0.2 - 0.5 (summer) 0.8 - 1.1 (winter)	< 0.31	Fence line monitoring at 6 locations for 9 weeks (summer) in 2006 and 16 weeks (winter) in 2009	2006 and 2009
9.03	2.25	8.57	0.4	0.11	Dispersion modelling on basis of emission inventory - closest contour to boundary.	unknown

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
5.11	2.29	8.03	6.5 boundary one month	0.80	Measurements in 28 locations in October 2006 included 7 boundary and 5 external stations. The boundary average was 6.5 µg/m^3 and the external average 5.3 µg/m^{3}due to a high value traffic station (15.6). Excluding this the external average was 2.8 µg/m^3 which is used here for the RCR.	Oct-06
5.10	2.15	7.52	2.7 boundary one month	0.77	Campaign in June 2007 included 8 boundary stations average 2.7 µg/m^3 and max 4.7 µg/m^3	Jun-07
6.17	2.05	7.17	1.6 and 1.3	0.45	Detailed monitoring at two stations (E and W) of refinery.	2009
9.11	1.93	6.77	not available		Permit requires inventory only as per PRTR regulation	
24.00	1.92	6.72	S1 0.53 - 1.96 S2 0.59 - 1.19 S3 0.87 - 1.17	0.56 0.34 0.33	Monitoring for Benzene at 3 locations outside of the fenceline is a requirement of permit. All within 1 km.	2007, 2008, 2009
2.04	1.90	6.65	2.5 (average public access perimeter in survey)	0.71	Survey at 9 perimeter locations for 4 weeks in 2001 when the ambient air quality standard was 10 µg/m µg/m^3. "hot spot" of extent < 400 m near loading facility with conc 7.7 µg/m µg/m^3.	2001
11.00	1.82	6.36	< 5.2		Five continuous monitoring stations at distances between 0.4 and 1.4 km from fenceline supported by campaigns near an integrated petrochemical site. Unfortunately refinery contributions cannot be determined and so a revised RCR is not estimated. The largest concentrations reported to be 4.5 µg/m^3 in 2008 and 5.2 µg/m^3 in 2009 and short duration campaigns gave support to this number. However, the national air quality network reports less than half this value for 2008 so the figures above may not represent annual averages.	2008-2009
1.00	1.81	6.32	3.5 (year)	1	Fenceline sampling over a year at 9 equally spaced locations and 3 outside stations at up to 2 km downwind. Fenceline measures averaged 3.5 µg/m^3 (range 2.2 to 4.6 µg/m^3) and external 2.2 µg/m^3 (range 2.1-2.2 µg/m^3)	April 1995 - March 1996

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
6.15	1.79	6.26	1.7	0.49	3 Measuring Stations within 1.1 km. Required Monitoring since 2004. All stations less then 1.5 (2005). The average over the 3 stations was 1.07 for 2007 and the average over all the data was also 1.07.	2004 - 2007
5.04	1.73	6.06	2.9	0.83	2 week long survey at 23 locations both on and off refinery site. Max concentration in habited areas 3.4 µg/m^3, average refinery boundary 4.04 µg/m^3 excluding hot spot, 6.76 µg/m^3 with hot spot. The average in populated areas surrounding the refinery was 2.9 µg/m^3.	year not known
5.04	1.73	6.06	3 (boundary averaged over the 3 months measured in 3 years)	0.86	Campaign using 23 locations including 7 fenceline and 3 external locations in July 2006. A focus on boundary measurements in September with 8 fenceline and 5 external measurements. A smaller study in July 2008. In July 2006 the average fenceline was 2.8 µg/m^3 and outside stations 3.0 µg/m^3. In Sept 2008 fenceline and external were < 1.5 µg/m^3 and in July 2009 fenceline average was 3.1 µg/m^3 due to one high point.	july 2006, sep 2008, july 2009
13.07	1.68	5.87	0.3 - 2.2 (typical fenceline in range across surveys.)	0.63	Short (2 week long) surveys comprising diffusion tube surveys around fenceline. Measurements include rail-loading facility just inside boundary which is not characteristic of perimeter. Timing survey in 2001 is not known. In the loading zone the spot measures are variable. Overall highest 12.1 µg/m^3 but more typically varying in range 3-7 µg/m^3	2001, 2003 (summer), 2004 (autumn) 2004(winter)
3.01	1.64	5.76			No Fenceline measurements.	2006
17.00	1.61	5.63	mean 0.83 and 1.2 overall max 3.6	0.34	A year of monitoring reporting 3 times a week (2 stations report 48 hour averages and 1 a 72 hour average). The location of the 2 stations is not known.	2009

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
6.04	1.60	5.61	0.4 over 3 summer months and 1.6 over 1 fall month.	0.46	2 surveys carried out in residential area next to tanks. One for 3 months in the summer and one for 4 weeks in the autumn. Results compared with city centre measures 65 km away (no refinery) and concentrations were lower than in the city centre (1.3 c.f. 0.4 µg/m^3 and 1.9 c.f. 1.6 µg/m^3) (city c.f. refinery)	2008
15.01	1.38	4.82	2.1 in 2005	0.60	Two 2-week long surveys with 50 and 52 sampling points (49 data points) to look at community and site values. A reduction in benzene concentrations between 2004 to 2005 was observed for some measuring points which implies VOC control measures were taken. Median reduces 7.38 µg/m^3 to 1.2 µg/m^3 and mean reduces 10.9 µg/m^3 to 2.1 µg/m^3 (over all samplers)	January 2004, June 2005
6.24	1.34	4.68	4-7 (background is 3-4)	0.86	Monitoring has taken place since 1988. About 200 spot measurements are made each of the measuring stations. These are sited to take account of the prevailing wind. Since 2004 the concentrations have been fairly similar. On the upwind side of there refinery values are typically 3 - 4 µg/m^3 and downwind 4- 7 µg/m^3.	1995-2008
27.04	1.31	4.57	< 0.1 spot sample	< 0.03	Fenceline samples are taken at 2 locations. Concentrations of 0.1 µg/m^3 and 0 µg/m^3 detected. Major on-site survey conducted in recent years resulted in major changes to reduce benzene emissions.	2010
4.01	1.13	3.95	1 - 2	0.56	Short term measures to determine values	unknown
10.00	1.01	3.53	1.2 and 1.5 (29 month average)	0.43	2 Monitoring stations on refinery fence generating annual averages using 1-2 month sampling periods. (22 sampling periods at each station). Very low variability. Max sample value 3.9 µg/m^3 at station 1 and 2.9 µg/m^3 at station 2.	mid 2007- end 2009
21.00	0.97	3.42	1.73	0.49	AQ monitoring station 500m from fence at nearest community, annual average.	2009

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
5.03	0.95	3.33	1.9 average since campaign	0.54	Monitoring Program since 2001 comprising quarterly campaigns on process plant, storage, waste water treatment and external boundary. Boundary concentrations were on average 4.8 up to and including 2007. A campaign to reduce VOC emissions resulted in average concentration below 2.1 µg/m^3 in 2008 and 1.6 µg/m^3 in 2009.	2001 - present
8.07	0.87	3.04	2.74 (year average excluding non detects) 1.98 (with non-detects as 0.0)	0.78	Local authority monitors refinery with station 300 m from fence. Daily averages reported for entire year.	2009
5.08	0.85	2.97	< 3.8 (typical concentration is 2.5)	0.71	Set of 6 2 week long campaigns (12 weeks) downwind of refinery.	Oct 2007 - Jan 2008
11.01	0.84	2.92	2	0.57	Continuous monitoring information is supported by campaigns. Monitoring stations (4) cover local community at distances up to 1.07 km from fence line. In 2008 and 2009 only one station measured above its detection limit and this was 500m from boundary. Campaigns verified concentrations < 1.5 µg/m^3 in 2008 and < 1 µg/m^3 in 2009 at stations.	2008 - 2009
5.07	0.83	2.92	2.7	0.77	Passive Samplers across region surrounding the site with focus on nearby town. One continuous sampler. Data for 4 months June to September. Average over nearest samples was 2.7 µg/m^3. Highest single monthly measure was 5 µg/m^3. At sample location away from town (opposite side of site) average concentration was 1.1 µg/m^3 (maximum 1.7 µg/m^3)	2006

RA Code	RCR	Implied Concentration µg/m^3	Data Concentration µg/m^3	Revised RCR	Comments	Date
7.01	0.75	2.64	3	0.86	Continuous monitoring. Station location unknown. Value for 2009 was 3 µg/m^3. Jan - May 2010 average was 1.8 µg/m^3	2009 - 2010
14.00	0.71	2.48	2.8 +/- 1.05	0.80	One month survey making 1/2 hour averages 1.7 km (approx) from fenceline	2010
9.02	0.68	2.36	1.85 one month	0.53	Campaign in September 2009 with 6 of 7 measurement stations on the boundary measuring < 1.5 µg/m^3 and one measuring 1.85 µg/m^3. Two outside stations one reported < 1.5 µg/m^3 and the other 3.82 µg/m^3.	Sep-09
5.06	0.52	1.81	1.3 for year. 1.63, 1.73, 1.77 for Q1 at stations.	0.51	Local authority monitoring outside of refinery at distances of 1.6, 1,7 and 2.8 km from fence. Whole year at one station which is also in town, Jan-Mar at other stations. Monitoring station at nearby (5.2 km to Ref) storage depot shows concentrations. of 1.2 µg/m^3 in 2007 and 1.0 µg/m^3 in 2005.	2009
5.16	0.34	1.19	7.3 average one month with 2 high values.		Campaign in Feb 2009 measured 3 fence line and 3 outside locations. One outside and one boundary measure were high 15.5 and 10.8 respectively - not known if there were traffic sources or location on hot spot so implied RCR not given. Other data-points suggest 3.8 - 4.0 µg/m^3 which is within AQ standard but above threshold requiring monitoring Average 7.3 µg/m^3	Feb-09

4. Conclusions

The combination of evidence from site monitoring and ambient AQ network monitoring shows that the estimated concentrations, coming from the REACH risk assessment for Low Boiling Point Naphthas (Gasolines), have no basis in fact.

Benzene is a priority chemical and risk management processes need to be in place to limit its accidental release to the environment. Evidence obtained here shows that such management takes place widely in the form of campaign or continuous monitoring of benzene.

The evidence points to annual average concentrations at the boundary of refinery sites being within the current European Ambient Air Quality standard of 5 $\mu g/m^3$ by a significant margin.

Using the measured benzene air concentration all reporting location have RCRs <=1. The air quality monitoring network measurements suggest a typical annual benzene concentration of 2 $\mu g/m^3$ for the industrial areas surrounding refineries which would set the RCR to be 0.6 using the current upper assessment threshold of the Air Quality Directive.