9. EXPOSURE ASSESSMENT

The following generic uses were evaluated in the exposure assessment of toluene.

Identified use	Process category (PROC)	Product Category (PC)	Sector of Use (SU)	Article category (AC)	Environmental release category (ERC)
Manufacture	PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15	NA	3, 8, 9	NA	ERC 1
Distribution	PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15	NA	3, 8, 9	NA	ERC1-7
Use as an intermediate	PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15	NA	3, 8, 9	NA	ERC 6a
Use in roads and construction (professional)	PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 11, PROC 13:	NA	22	NA	ERC 8d, 8f
Use in cleaning agents (industrial)	PROC 2, PROC 3, PROC 4, PROC 7, PROC 8a, PROC 8b, PROC 10, PROC 13	NA	3, 10	NA	ERC 4
Use in cleaning agents (professional)	PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 13	NA	22	NA	ERC 8a, 8d
Use as a fuel (industrial)	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16	NA	3, 10	NA	ERC 7
Use as a fuel (professional)	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16	NA	22	NA	ERC 9a, 9b
Use as a fuel (consumer)	NA	PC 13	21	NA	ERC 9a, 9b

Table 51 Generic uses evaluated

Use in coatings (industrial)	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15	NA	3, 10	NA	ERC 4
Use in coatings (professional)	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19	NA	22	NA	ERC 8a, 8d
Use in coatings (consumer)	NA	PC4, PC5, PC9, PC10, PC15, PC18, PC23, PC24, PC31	21	NA	ERC 8a, 8d
Use in oilfield drilling operations (industrial)	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b	NA	3, 10	NA	NA
Use in binders and release agents (industrial)	PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14	NA	3, 8, 9	NA	ERC 4
Use in binders and release agents (professional)	PROC1, PROC2, PROC3, PROC4, PROC6, PROC 8a, PROC8b, PROC10, PROC11, PROC14	NA	22	NA	ERC 8a, 8d
Use as a laboratory reagent (industrial)	PROC10, PROC15	NA	3, 10	NA	ERC 2, 4
Use as a laboratory reagent (professional)	PROC10, PROC15	NA	22	NA	ERC 8a
Use as a functional fluid (industrial)	PROC1, PROC2, PROC3, PROC4, PROC 8a, PROC 8b, PROC9	NA	3, 8, 9	NA	ERC 7
Use as a functional fluid (professional)	PROC1, PROC2, PROC3, PROC 8a, PROC9, PROC20	NA	22	NA	ERC 9a, 9b
Use in rubber manufacture (industrial)	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC13, PROC14, PROC15, PROC21	NA	10	NA	ERC 4, 6d
Formulation	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15	NA	3, 10	NA	ERC 2

The following information was used for the exposure assessments:

Substance	Toluene
CASRN	108-88-3
Substance volatility:	4030 Pa at 25°C
TRA volatility range	Medium
physical property	Liquid
MOLW	92.14
MP	-95°C
BP	110.6°C
SOL	573 mg/l at 25°C
Log K_{ow}	2.73

9.1. Exposure scenario 1: Manufacture of toluene

9.1.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Manufacture of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
	Environmental Release Categories: ERC1
Processes, tasks, activities covered	Manufacture of Substance A or use as an intermediate or process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	No specific measures identified [EI18].
Process sampling [CS2].	Provide a good standard or general ventilation (not less than 3-5 air changes per hour [E11] or wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Laboratory activities [CS36].	No specific measures identified [EI18].

Bulk transfers [CS14]. (open systems) [CS108]With potential for aerosol generation [CS138].	Provide a good standard or general ventilation (not less than 3-5 air changes per hour [E11] or Operate activity away from sources of emissions or release [E77], alternatively, if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Bulk transfers [CS14]. (closed systems) [CS107];	Provide a good standard or general ventilation (not less than 3-5 air changes per hour [E11] or Operate activity away from sources of emissions or release [E77], alternatively, if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts Used	EU tonnage	3000 ktonnes/year
	Regional tonnage	300 ktonnes/year
	Fraction of main local source	1.00E+00
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	40
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 1.1.v1/Appendix C) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.005
	Release fraction to waste water from process before RMM	0.0001
	Release fraction to soil from process before RMM	0.0001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >90%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 4: During manufacturing no waste of the substance is generated.
Conditions and measures related to external recovery of waste	ERW 2: During manufacturing no waste of the substance is generated.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

1

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment
	Risk-driving Compartment – Sewage Treatement Plant
	Msafe 4.07E+06kg/day after RMM
Site Use	300 ktonnes/year
Onsite risk management measures	93.3 % efficiency water, 90 % efficiency air

Dilution factors	Freshwater	40
	Marine water	100
Initial release percent at site to water (before RMM)		0.3
Typical release to water after RMM		8.52E-02 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.1.2. Exposure estimation

9.1.2.1. Workers exposure

The worker exposure estimates for the activities associated with the manufacturing of toluene were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2 used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

The worker exposure modeling using ECETOC TRA relates to full shift average exposures, however there is also a need to assess shorter term —Peak exposures. These can be calculated from the longer term estimations.

Full shift estimates in the ECETOC TRA are assumed to represent the 90th percentile of the exposure distribution. It is also assumed that in general the variability will not be very high. Under these circumstances, as per the revised R14 guidance the full shift ECETOC TRA estimate is multiplied by a factor of 2 to estimate the 95th percentile related short term exposure distribution.

As the short term DNEL is two times higher than the DNEL applied in risk characterisation for full shift exposure it is concluded that the RMMs adequate to derive an RCR <1 for full shift exposure also provide adequate protection against short term —peak exposures.

9.1.2.2. Consumer exposure

Not applicable

9.1.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.1.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.1.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.20.

9.2. Exposure scenario 2: Distribution of toluene

9.2.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Distribution of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
	Environmental Release Categories: ERC1 (loading) ERC2 (repacking)
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]

Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15]. ; With sample collection [CS56]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	No specific measures identified [EI18].
Process sampling [CS2].	No specific measures identified [EI18].
Laboratory activities [CS36].	No specific measures identified [EI18].

Bulk transfers [CS14]. ; (closed systems) [CS107]	No specific measures identified [EI18].
Bulk transfers [CS14]. ; (open systems) [CS108]	Provide a good standard or general ventilation (not less than 3-5 air changes per hour [E11] or Operate activity away from sources of emissions or release [E77], alternatively, if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Drum and small package filling [CS6].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11 or Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Equipment cleaning and maintenance [CS39].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Storage [CS67]With occasional controlled exposure [CS137]	Drain down and flush system prior to equipment break-in or maintenance [E55].
	No specific measures identified [EI18].

Section 2.2		
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts Used	EU tonnage	3000 ktonnes/year
	Regional tonnage	300 ktonnes/year
	Fraction of main local source	1.00E+00
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 1.1b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.0001
	Release fraction to waste water from process before RMM	0.00001
	Release fraction to soil from process before RMM	0.00001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >90%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	

Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment
	Risk-driving Compartment – Soil
	Msafe 1.36 E+07kg/day after RMM
Site Use	300 ktonnes/year
Onsite risk management measures	93.3 % efficiency water, 90 % efficiency air

Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.001
Typical release to water after RMM		3.49E-02 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.2.2. Exposure estimation

9.2.2.1. Workers exposure

The worker exposure estimates for the activities associated with the distribution of toluene were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2 used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.2.2.2. Consumer exposure

Not applicable.

9.2.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.2.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.2.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.3. Exposure scenario 3: Use of toluene as an intermediate

For the worker exposure assessment use as an intermediate is included in manufacture of toluene, see section 9.1.

9.3.1. Exposure scenario

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts Used	EU tonnage	120ktonnes/year
	Regional tonnage	12 ktonnes/year
	Fraction of main local source	1.00E+00
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 6.1a.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.002
	Release fraction to waste water from process before RMM	0.003
	Release fraction to soil from process before RMM	0.001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >80%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	Prevent discharge of undissolved substance to or recover from wastewater [TCR14].	
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 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
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. [ETW 5]	

Conditions and measures related to external recovery of waste	This substance is consumed during use and no waste of the substance is generated. [EWR 3]
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*Not applicable*
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1. This is only applicable to the intermediate exposure scenario.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Not applicable*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 90.9% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 4.56E+04g/day after RMM	
Substance Use	12 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 80 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.3
Typical release to water after RMM		4.03E-01 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Not applicable*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.3.2. Exposure estimation

9.3.2.1. Workers exposure

Not applicable.

9.3.2.2. Consumer exposure

Not applicable.

9.3.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.3.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.2.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.4. Exposure scenario 4: Use of toluene in roads and construction - Professional

9.4.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in road and construction appliances of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13
	Environmental Release Categories: ERC 8Dand 8F
Processes, tasks, activities covered	Application of surface coatings and binders in road and construction activities, including paving uses, manual mastic and in the application of roofing and water-proofing membranes.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
	0

Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Drum/batch transfers [CS8]. ; Non-dedicated facility [CS82]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. or if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Drum/batch transfers [CS8]. ; Dedicated facility [CS81]	Ensure material transfers are under containment or extract ventilation [E66]. or if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Manual roller application or brushing [CS13].	Ensure operation is undertaken outdoors [E69].

Spraying/fogging by machine application [CS25].	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Dipping, immersion and pouring [CS4].	Ensure operation is undertaken outdoors [E69].
Equipment cleaning and maintenance [CS39].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]	No specific measures identified [EI18].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	30ktonnes
	Regional tonnage	3ktonnes
	Fraction of the main locall source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.15.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.95
	Release fraction to waste water from process before RMM	0.01
	Release fraction to soil from process before RMM	0.04
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	

	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3 : External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1 : External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None
Basis for scaling	Environment
	Risk-driving Compartment – Freshwater
	Msafe 5748 kg/day before RMM

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Basis for scaling	Environment
	Risk-driving Compartment – Freshwater
	Msafe 7.85E+04kg/day after RMM
Site Use	0.06ktonnes/year

Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		1
Typical release to water after RMM		1.97E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.4.2. Exposure estimation

9.4.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in road and construction applications were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.4.2.2. Consumer exposure

Not applicable

9.4.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.4.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.3.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.5. Exposure scenario 5: Use of toluene in cleaning agents-Industrial

9.5.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in cleaning agents of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13
	Environmental Release Categories: ERC4
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.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Automated process with (semi) closed systems [CS93]. Use in contained systems [CS38].	No specific measures identified [EI18].
Automated process with (semi) closed systems [CS93]Use in contained systems [CS38]. ; Drum/batch transfers [CS8]. Use in contained systems [CS38].	No specific measures identified [EI18].
Application of cleaning products in closed systems [CS101]	No specific measures identified [EI18].

Filling / preparation of equipment from drums or containers. [CS45]. Dedicated facility [CS81]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Provide a good standard or general ventilation (not less than 3-5 air changes per hour [E11] or , if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Use in contained batch processes [CS37]. Treatment by heating [OC129]	Provide extract ventilation to points where emissions occur [E54].
Degreasing small objects in cleaning station [CS41].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Cleaning with low-pressure washers [CS42].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Cleaning with high pressure washers [CS44].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Limit the substance content in the product to 5% [OC17]
Manual [CS34]. Surfaces [CS48]. Cleaning [CS47]. No spraying [CS60].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes
	Regional tonnage	1.5ktonnes
	Fraction of the main locall source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 4.4a.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.3
	Release fraction to waste water from process before RMM	0.00003
	Release fraction to soil from process before RMM	0

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR7: Treat air emissions to provide a typical removal efficiency of >70%.
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 3: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment

	Risk-driving Compartment – Freshwater	
	Msafe 1.77E+06kg/day after RMM	
Site Use	1.5 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 70 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.003
Typical release to water after RMM		1.92E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Control of environmental exposure

Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.5.2. Exposure estimation

9.5.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in cleaning agents (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.5.2.2. Consumer exposure

Not applicable

9.5.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.5.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.4.1 Exposure Scenario: See Appendix

B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.6. Exposure scenario 6: Use of toluene in cleaning agents – Professional

9.6.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in cleaning agents of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13
	Environmental Release Categories: ERC 8A, ERC 8D
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).
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Filling / preparation of equipment from drums or containers. [CS45]. Dedicated facility [CS81]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Automated process with (semi) closed systems [CS93]Use in contained systems [CS38].	No specific measures identified [EI18].
Automated process with (semi) closed systems [CS93]Use in contained systems [CS38]. ; Drum/batch transfers [CS8].	No specific measures identified [EI18].
Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products) [CS76]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].

Filling / preparation of equipment from drums or containers. [CS45]. Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Avoid carrying out operation for more than 4 hours [OC12].
Manual [CS34]. Cleaning [CS47]. ; Surfaces [CS48]. ; Dipping, immersion and pouring [CS4].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Cleaning with low-pressure washers [CS42]. Rolling, Brushing [CS51]. ; No spraying [CS60].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Cleaning with high pressure washers [CS44]. Spraying [CS10]. Indoor [OC8].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Cleaning with high pressure washers [CS44]. Spraying [CS10]. Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Manual [CS34]. Surfaces [CS48]. ; Cleaning [CS47]. ; Spraying [CS10].	Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Ad hoc manual application via trigger sprays, dipping, etc. [CS27]. Rolling, Brushing [CS51].	Provide extract ventilation to points where emissions occur [E54].
Ad hoc manual application via trigger sprays, dipping, etc. [CS27]. Rolling, Brushing [CS51].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].
Application of cleaning products in closed systems [CS101] Outdoor [OC9].	Ensure operation is undertaken outdoors [E69].
Cleaning of medical devices [CS74]	Provide extract ventilation to points where emissions occur [E54].
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes
	Regional tonnage	1.5ktonnes
	Fraction of the main locall source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced	Local Freshwater dilution factor	10

by risk management	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.4b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.02
	Release fraction to waste water from process before RMM	0.000001
	Release fraction to soil from process before RMM	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3 : External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1 : External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*

4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant*

Values for Scaling Purposes factsheet DSU 4 : Further details on scaling and control technologies are provided in SpERC (http://cefic.org/en/reach-for-industries-libraries.html).		
Basis for scaling	Environment	
	Risk-driving Compartment – Freshwater	
	Msafe 3.895E+03kg/day after RMM	
Site Use	0.003 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.0001
Typical release to water after RMM		1.44E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.6.2. Exposure estimation

9.6.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in cleaning agents (professional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables

1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.6.2.2. Consumer exposure

Not applicable

9.6.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.6.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.5.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.7. Exposure scenario 7: Use of toluene as a fuel – Industrial

9.7.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC7
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].	No specific measures identified [EI18].
Drum/batch transfers [CS8].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. Batch process [CS55].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. ; (closed systems) [CS107]	No specific measures identified [EI18].

General exposures (open systems) [CS16]. ; (closed systems) [CS107]. Batch process [CS55].	No specific measures identified [EI18].
Equipment maintenance [CS5].	Drain down and flush system prior to equipment break-in or maintenance [E55].Wear suitable coveralls to prevent exposure to the skin [PPE27].
Vessel and container cleaning [CS103]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Storage [CS67]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	150ktonnes
	Regional tonnage	15ktonnes
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 7.12a.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.0025
	Release fraction to waste water from process before RMM	0.00001
	Release fraction to soil from process before RMM	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >95%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	

Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]

Conditions and measures related to external treatment of waste for disposal	ETW 5: This substance is consumed during use and no waste of the substance is generated.
Conditions and measures related to external recovery of waste	ERW 3: This substance is consumed during use and no waste of the substance is generated.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Freshwater	
	Msafe 1.11E+07kg/day after RMM	
Site Use	15 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 95 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.001

Typical release to water after RMM	3.06E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.7.2. Exposure estimation

9.7.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene as a fuel (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.7.2.2. Consumer exposure

Not applicable

9.7.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.7.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.6.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.8. Exposure scenario 8: Use of toluene as a fuel – Professional

9.8.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC 9A, ERC 9B
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Drum/batch transfers [CS8].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Dipping, immersion and pouring [CS4].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].

General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. (closed systems) [CS107]	Handle substance within a closed system [E47]. No other specific measures identified [EI20].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].
Vessel and container cleaning [CS103]	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]	Store substance within a closed system [E84].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	150ktonnes
	Regional tonnage	15ktonnes
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 9.12b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.001
	Release fraction to waste water from process before RMM	0.00001
	Release fraction to soil from process before RMM	0.00001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	

Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]

Conditions and measures related to external treatment of waste for disposal	ETW 5: This substance is consumed during use and no waste of the substance is generated.
Conditions and measures related to external recovery of waste	ERW 3: This substance is consumed during use and no waste of the substance is generated.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

1

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).		
Basis for scaling	Environment	
	Risk-driving Compartment – Freshwater	
	Msafe 3.895E+03kg/day after RMM	
Site Use	0.03 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.001

Typical release to water after RMM	1.44E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.8.2. Exposure estimation

9.8.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene as a fuel (professional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.8.2.2. Consumer exposure

Not applicable

9.8.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.8.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.7.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.9. Exposure scenario 9: Use of toluene as a fuel – Consumer

9.9.1. Exposure scenario

Section 1		**Exposure Scenario Title**
Title		**Fuels**
Sector of Use (SU code)		21
Use Descriptor (PC codes)		PC13
Processes, tasks, activities covered		Covers consumer uses in liquid fuels
Environmental Release Category		ERC 9A and 9B
Section 2		**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required - pending better understanding from ECHA		
Section 2.1		**Control of consumer exposure**
Product characteristics		
Physical form of product		liquid
Vapour pressure		3089
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].
Section 2.1.1		**Product categories**
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 beyong those OCs stated
Liquid - subcategories added: Automotive Refuelling--Tier 2: inhalation measured data and Tier 2 dermal	OC	
	RMM	

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 beyong those OCs stated
Liquid - subcategories added: Scooter Refuelling--Tier 2: inhalation measured data and Tier 2 dermal: used same as vehicle refueling	OC	
	RMM	
PC13:Fuels--Liquid - subcategories added: Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyong those OCs stated
Liquid - subcategories added: Garden Equipment - Use--Tier 2: inhalation measured data	OC	
	RMM	
PC13:Fuels--Liquid (subcategories added): Garden Equipment - Refueling	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 typcial 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 beyong those OCs stated
Liquid (subcategories added): Garden Equipment - Refueling--Tier 2: inhalation measured data and dermal modeled	OC	
	RMM	
PC13:Fuels--Liquid - subcategories added: Lamp oil	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 100g [ConsOC2]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.01hr/event[ConsOC14];

	RMM	No specific RMMs developed beyong those OCs stated

Section 2.2		
Assessment method	EUSES 2.1.1 using default relase fractions from ESVOC SpERC 9.12c.v1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts Used	EU tonnage	150 ktonnes/year
	Regional tonnage	15 ktonnes/year
	Fraction of main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process	0.001
	Release fraction to waste water from process	0.00001
	Release fraction to soil from process (regional only)	0.00001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Treat air emissions to provide a typical removal efficiency of >0%. [TCR 7]	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	Soil emission controls are not applicable as there is no direct release to soil. [TCR 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 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 20000 (m^3/d) [STP5]	
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. [ETW 3]	
Conditions and measures related to external recovery of waste	External recovery and recycling of waste should comply with applicable local and/or national regulations.[ERW 1]	

Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

1

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Freshwater	
	Msafe 3.895E+03kg/day after RMM	
Substance Use	0.03 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.001
Typical release to water after RMM		1.44E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates	

related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.9.2. Exposure estimation

9.9.2.1. Workers exposure

See 9.7

9.9.2.2. Consumer exposure

See above.

9.9.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.9.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.9.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.10. Exposure scenario 10: Use of toluene in coatings - Industrial

9.10.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in coatings of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC 9, PROC10, PROC13, PROC15
	Environmental Release Categories: ERC 4
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.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]

Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. With sample collection [CS56]. ; Use in contained systems [CS38].	No specific measures identified [EI18].
Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing [CS94]	No specific measures identified [EI18].
Mixing operations (closed systems) [CS29]. General exposures (closed systems) [CS15].	No specific measures identified [EI18].
Film formation - air drying [CS95]	No specific measures identified [EI18].

Preparation of material for application [CS96]Mixing operations (open systems) [CS30].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Spraying (automatic/robotic) [CS97]	Carry out in a vented booth or extracted enclosure [E57].
Manual [CS34]. Spraying [CS10].	Carry out in a vented booth or extracted enclosure [E57]. Or Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Material transfers [CS3]. Non-dedicated facility [CS82]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Material transfers [CS3]. Dedicated facility [CS81]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Roller, spreader, flow application [CS98]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Dipping, immersion and pouring [CS4].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Laboratory activities [CS36].	No specific measures identified [EI18].
Material transfers [CS3]. Drum/batch transfers [CS8]. ; Transfer from/pouring from containers [CS22].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Production or preparation or articles by tabletting, compression, extrusion or pelletisation [CS100]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	45ktonnes
	Regional tonnage	4.5ktonnes
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 4.3a.v1) give rise to following releases fractions		

Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.98
	Release fraction to waste water from process before RMM	0.007
	Release fraction to soil from process before RMM	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >90%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and / or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

1

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).		
Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 1.99E+04kg/day after RMM	
Site Use	4.5 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 90 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.7
Typical release to water after RMM		3.44E-01 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.10.2. Exposure estimation

9.10.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in coatings (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.10.2.2. Consumer exposure

Not applicable

9.10.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.10.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.10.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.11. Exposure scenario 11: Use of toluene in coatings – Professional

9.11.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in coatings of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19
	Environmental Release Categories: ERC 8A, ERC 8D
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.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
Filling / preparation of equipment from drums or containers. [CS45].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. Use in contained systems [CS38].	No specific measures identified [EI18].

Preparation of material for application [CS96]	No specific measures identified [EI18].
Film formation - air drying [CS95] Outdoor [OC9].	Ensure operation is undertaken outdoors [E69].
Film formation - air drying [CS95] Indoor [OC8].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Preparation of material for application [CS96] Indoor [OC8].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Preparation of material for application [CS96]	Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC28]
Material transfers [CS3]. Drum/batch transfers [CS8].	Use drum pumps or carefully pour from container [E64].
Material transfers [CS3]. Drum/batch transfers [CS8].	Use drum pumps or carefully pour from container [E64].Use container to collect drips [E73].
Roller, spreader, flow application [CS98] Indoor [OC8].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Roller, spreader, flow application [CS98] Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Manual [CS34]. Spraying [CS10]. ; Indoor [OC8].	Carry out in a vented booth or extracted enclosure [E57].
Manual [CS34]. Spraying [CS10]. ; Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Dipping, immersion and pouring [CS4]. Indoor [OC8].	Provide extract ventilation to points where emissions occur [E54].
Dipping, immersion and pouring [CS4]. Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely. [PPE21]
Laboratory activities [CS36].	No specific measures identified [EI18].
Hand application - fingerpaints, pastels, adhesives [CS72] Indoor [OC8].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Ensure doors and windows are opened [E72].
Hand application - fingerpaints, pastels, adhesives [CS72] Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely. [PPE21]
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	150ktonnes

	Regional tonnage	15ktonnes
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.3b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.98
	Release fraction to waste water from process before RMM	0.01
	Release fraction to soil from process before RMM	0.01
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and / or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**

4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).		
Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 1.27E+04kg/day after RMM	
Substance Use	0.03 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		1
Typical release to water after RMM		4.11E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.11.2. Exposure estimation

9.11.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in coatings (professional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.11.2.2. Consumer exposure

Not applicable

9.11.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.11.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.11.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.12 Exposure assessment 12: Use of toluene in coatings – Consumer

In the absence of experimental animal data or human case reports indicating a potential to cause local toxicity, a reference value for local effects was developed based on results of skin irritation testing; this showed erythema (redness) persisting for longer than 24 hr following dermal application of 0.5 ml liquid (433 mg) to 6 cm2 of rabbit skin (conditions assumed identical to those of EU guideline B4). In view of the response obtained, it is not unreasonable to predict that no irritation would occur after application of one third of the guideline amount (144 mg). This is equivalent to local dermal reference dose of 24 mg/cm2.

The inhalation long-term systemic DNEL for the general population is based upon the internal dose received by a worker engaged in light activity (respiratory volume 0.144 m3/kg body weight) and exposed to the IOELV (192 mg/m3) for 8 hours, modified after accounting for intra-species differences assumed inherent in the two populations (assessment factor = 1.7). The resultant internal dose is 16.3 mg/kg bwt/day.

9.12.1. Exposure scenario

Section 1		**Exposure Scenario Title**
Title		**Uses in Coatings**
Sector of Use (SU code)		21
Use Descriptor (PC codes)		PC1, PC4, PC8 (excipient only), PC9, PC15, PC18, PC23, PC24, PC31, PC34 (PC5,PC10)
Processes, tasks, activities covered		Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning.
Environmental Release Category		ERC9A and 9B
Specific Environmental Release Category		
Section 2		**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required - pending better understanding from ECHA		
Section 2.1		**Control of consumer exposure**
Product characteristics		
Physical form of product		liquid
Vapour pressure		3089
Concentration of substance in product		Unless otherwise stated, cover concentrations up to 100% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to13800g [ConsOC2]; covers skin contact area up to 857.5cm2 [ConsOC5]
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 1 times per day [ConsOC4]; covers exposure up to 6 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].
Section 2.1.1		**Product categories**

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 typcial 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
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 typcial 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
PC4_n:Anti-freeze and de-icing products--Lock de-icer	OC	Unless otherwise stated, covers concentrations up to 50% [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 typcial 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
PC8_n: Biocidal products (excipient use only for solvent 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 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
PC8_n: Biocidal products (excipient use only for solvent 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 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
PC8_n: Biocidal products (excipient use only for solvent products)--Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)	OC	Unless otherwise stated, covers concentrations up to 15% [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 428.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 35g [ConsOC2]; 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
PC9a:Coatings and paints, fillers putties, thinners--Waterborne latex wall paint	OC	Unless otherwise stated, covers concentrations up to 0.8% [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 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
PC9a:Coatings and paints, fillers putties, thinners--Solvent rich, high solid, water borne paint	OC	Unless otherwise stated, covers concentrations up to 2.5% [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 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
PC9a:Coatings and paints, fillers putties, thinners--Removers (paint-, glue-, wall paper-, sealant-remover)	OC	Unless otherwise stated, covers concentrations up to 4% [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 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
PC9b:Fillers, putties, plasters, modeling clay--Fillers and putty	OC	Unless otherwise stated, covers concentrations up to 2% [ConsOC1]; covers use up to 12 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 35.73 cm2 [ConsOC5]; for each use event, covers use amounts up to 85g [ConsOC2]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated
PC9b:Fillers, putties, plasters, modeling clay--Plasters and floor equalizers	OC	Unless otherwise stated, covers concentrations up to 0.1% [ConsOC1]; covers use up to 12 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 13800g [ConsOC2]; 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
PC9b:Fillers, putties, plasters, modeling clay--Modelling clay	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]; covers skin contact area up to 254.40 cm2 [ConsOC5]; for each use event, assumes swallowed amount of 1g [ConsOC13]; 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

PC9c:Finger paints --Finger paints	OC	Unless otherwise stated, covers concentrations up to 0.1% [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 254.40 cm2 [ConsOC5]; for each use event, assumes swallowed amount of 1.35g [ConsOC13]; 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
PC15_n: Non-metal surface treatment products--Waterborne latex wall paint	OC	Unless otherwise stated, covers concentrations up to 0.28% [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 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
PC15_n: Non-metal surface treatment products--Solvent rich, high solid, water borne paint	OC	Unless otherwise stated, covers concentrations up to 1% [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 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
PC15_n: Non-metal surface treatment products--Aerosol spray can	OC	Unless otherwise stated, covers concentrations up to 4.5% [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 typcial 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
PC15_n: Non-metal surface treatment products--Removers (paint-, glue-, wall paper-, sealant-remover)	OC	Unless otherwise stated, covers concentrations up to 1.5% [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 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
PC18_n: Ink and toners--Inks and toners.	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 71.40 cm2 [ConsOC5]; for each use event, covers use amounts up to 40g [ConsOC2]; 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

PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, wax / cream (floor, furniture, shoes)	OC	Unless otherwise stated, covers concentrations up to 11% [ConsOC1]; covers use up to 29 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 430.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 56g [ConsOC2]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 1.23hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated
PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, spray (furniture, shoes)	OC	Unless otherwise stated, covers concentrations up to 8% [ConsOC1]; covers use up to 8 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 430.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 56g [ConsOC2]; 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
PC24: Lubricants, greases, and release products--Liquids	OC	Unless otherwise stated, covers concentrations up to 35% [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 typcial 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
PC24: Lubricants, greases, and release products--Pastes	OC	Unless otherwise stated, covers concentrations up to 20% [ConsOC1]; 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 a one car garage (34m3) under typcial ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11];
	RMM	No specific RMMs identified beyond those OCs stated
PC24: Lubricants, greases, and release products--Sprays	OC	Unless otherwise stated, covers concentrations up to 5% [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 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
PC31:Polishes and wax blends--Polishes, wax / cream (floor, furniture, shoes)	OC	Unless otherwise stated, covers concentrations up to 4.5% [ConsOC1]; covers use up to 29 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 430.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 142g [ConsOC2]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 1.23hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated

PC31:Polishes and wax blends--Polishes, spray (furniture, shoes)	OC	Unless otherwise stated, covers concentrations up to 14% [ConsOC1]; covers use up to 8 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 430.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 35g [ConsOC2]; 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
PC34_n: Textile dyes, finishing and impregnating 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 115g [ConsOC2]; 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

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	150 ktonnes
	Regional tonnage	15 ktonnes
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.3c.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from wide dispersive use (regional only)	0.985
	Release fraction to wastewater from wide dispersive use (regional only)	0.01
	Release fraction to soil from wide dispersive use (regional only)	0.005
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater [TCR1a]	
	Treat air emission to provide a typical removal efficiency of 0% [TCR 7]	
Organisation measures to prevent/limit release from site	Prevent environmental discharge consistent with regulatory requirements. [OMS4]	

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
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]
Other environmental control measures additional to above	None

Section 3		**Exposure Estimation *('Flexible' heading)***
ECHA Note in draft template: Exposure estimation and risk characterisation ratios (for all routes of expoure for consumers and all compartments for environment) resulting from the conditions described under Sections 2.1 and 2.2.), and the substance properties; make reference to the exposure assessment tool applied. Note: Detail could be confusing for customers. Also may be an extensive list. Proposal to include a weblink from where these data can be retrieved (a component of GES development).		
3.1. Health		
		When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.
3.2. Environment		
		When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.
Section 4		**Guidance to check compliance with the Exposure Scenario *('Flexible' heading)***
Guidance how the DU can evaluate whether he operates within the conditions set in the exposure scenario - scaling tools. Standard phrases		
4.1. Health		
		Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.
4.2. Environment		
		Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment

	Risk-driving Compartment – Freshwater	
	Msafe 1.36E+04kg/day after RMM	
Site Use	0.03 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		1
Typical release to water after RMM		4.11E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.

9.12.2. Exposure estimation

9.12.2.1. Workers exposure

Not applicable

9.12.2.2. Consumer exposure

The consumer exposure estimates for activities associated with the consumer use in coatings of toluene were assessed using a tool based on the ECETOC TRAv2 (See Appendix A). Appendix A contains input tables used to model the consumer exposures. These tables contain all the operating conditions used to conduct the modelling and the default parameters of the model.

9.12.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.12.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.12.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.13 Exposure assessment 13: Use of toluene in oilfield drilling and production operations – Industrial

9.13.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in oil field drilling and production operations of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b
	Environmental Release Categories: ERC4
Processes, tasks, activities covered	Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. or Operate activity away from sources of emissions or release [E77], alternatively, if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Filling / preparation of equipment from drums or containers. [CS45].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Drill floor operations [CS116].	No specific measures identified [EI18].
Drill floor operations [CS116].	Ensure operation is undertaken outdoors [E69].
Operation of solids filtering equipment - vapour exposures [CS118].	Ensure material transfers are under containment or extract ventilation [E66].
Operation of solids filtering equipment - aerosol exposures [CS119].	Ensure material transfers are under containment or extract ventilation [E66].
Operation of solids filtering equipment [CS117].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].

Treatment and disposal of filtered solids [CS121].	No specific measures identified [EI18].
Process sampling [CS2].	No specific measures identified [EI18].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
Pouring from small containers [CS9].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear suitable gloves tested to EN374 [PPE15].
General exposures (open systems) [CS16].	Ensure operation is undertaken outdoors [E69].
Equipment cleaning and maintenance [CS39].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear suitable gloves tested to EN374 [PPE15].
Batch process [CS55].	No specific measures identified [EI18].
Batch process [CS55]. With occasional controlled exposure [CS137]	Provide extract ventilation to points where emissions occur [E54].

Section 2.2	**Control of environmental exposure**	
Assessment method	Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	30ktonnes
	Regional tonnage	3ktonnes
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	N/A
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	N/A
	Local marine water dilution factor	N/A
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	N/A
	Release fraction to water from process before RMM	N/A
	Release fraction to soil from process before RMM	N/A
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Discharge to aquatic environment is restricted (see Section 4.2)	
Organisation measures to prevent/limit release from site	Prevent environmental discharge consistent with regulatory requirements.	

Conditions and measures related to municipal sewage treatment plant	N/A
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	N/A

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*Quantitative exposure and risk assessment not possible due to lack of emissions to aquatic environment. Qualitative approach used to conclude safe use.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Discharge to aquatic environment is restricted by law and industry prohibits release.* *[1]OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas Installations in 2007, including the assessment of data reported in 2006 and 2007*.

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Basis for scaling	Environment
	#N/A
Site Use	3 ktonnes/year
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air

Dilution factors	Freshwater	#N/A
	Marine water	#N/A
Initial release percent at site to water (before RMM)		#N/A
Typical release to water after RMM		#N/A

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.13.2. Exposure estimation

9.13.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in oilfield drilling and production operations (industrial) were assessed sing ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.13.2.2. Consumer exposure

Not applicable

9.13.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.13.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.13.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.14 Exposure assessment 14: Use of toluene in binders and release agents – Industrial

9.14.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in binders and release agents of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9) Process Categories: PROC1, PROC2, PROC3, PROC4, PROC6, PROC7, PROC8b, PROC10, PROC13, PROC14 Environmental Release Categories: ERC5
Processes, tasks, activities covered	Covers the use as binders and release agents including material transfers, mixing, application (including spraying and brushing), mould forming and casting, and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]

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Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Material transfers [CS3].	No specific measures identified [EI18].
Material transfers [CS3]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
Material transfers [CS3]. Batch process [CS55]. ; (closed systems) [CS107].	No specific measures identified [EI18].
Drum/batch transfers [CS8].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Mixing operations (closed systems) [CS29].	No specific measures identified [EI18].
Mixing operations (open systems) [CS30].	No specific measures identified [EI18].

Mold forming [CS31].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Casting operations [CS32].	Provide extract ventilation to points where emissions occur [E54].
Spraying [CS10]. Machine [CS33].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
Manual roller application or brushing [CS13].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Storage [CS67]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes
	Regional tonnage	1.5ktonnes
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 4.10a.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.2
	Release fraction to waste water from process before RMM	0.00003
	Release fraction to soil from process before RMM	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >80%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	

Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

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3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 7.44E+05kg/day after RMM	
Substance Use	1.5 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 80 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100

Initial release percent at site to water (before RMM)	0.003
Typical release to water after RMM	1.92E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.14.2. Exposure estimation

9.14.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in binders and release agents (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.14.2.2. Consumer exposure

Not applicable

9.14.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.14.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.14.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.15 Exposure assessment 15: Use of toluene in binders and release agents – Professional

9.15.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use as mould release and binder of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC6, PROC 8a, PROC8b, PROC10, PROC11, PROC14
	Environmental Release Categories: ERC 8 series (A, B, C, D, E, F)
Processes, tasks, activities covered	Covers the use as binders and release agents including material transfers, mixing, application by spraying, brushing, and handling of waste
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20ºC above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Material transfers [CS3]. ; (closed systems) [CS107]	No specific measures identified [EI18].
Material transfers [CS3]. ; (closed systems) [CS107]With occasional controlled exposure [CS137]	No specific measures identified [EI18].
Material transfers [CS3]. ; (closed systems) [CS107]Batch process [CS55].	No specific measures identified [EI18].
Drum/batch transfers [CS8].	Transfer materials directly to mixing vessels [E45].
Mixing operations (closed systems) [CS29].	No specific measures identified [EI18].

Mixing operations (open systems) [CS30].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Mold forming [CS31].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Casting operations [CS32]. ; (open systems) [CS108]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Spraying [CS10]. ; Manual [CS34].	Carry out in a vented booth or extracted enclosure [E57]. ; Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Manual roller application or brushing [CS13].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Spraying [CS10]. ; Manual [CS34].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Storage [CS67]	No specific measures identified [EI18].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes/year
	Regional tonnage	1.5ktonnes/year
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.10b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.95
	Release fraction to waste water from process before RMM	0.025
	Release fraction to soil from process before RMM	0.025
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to	Not applicable	

prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment
	Risk-driving Compartment – Freshwater
	Msafe 2.66E+03 kg/day after RMM
Substance Use	0.003 ktonnes/year

Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		2.5
Typical release to water after RMM		2.10E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Control of environmental exposure

Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.15.2. Exposure estimation

9.15.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in binders and release agents (professional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.15.2.2. Consumer exposure

Not applicable

9.15.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.15.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.15.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.16 Exposure assessment 16: Use of toluene as a laboratory reagent – Industrial

9.16.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in laboratory reagents of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC10, PROC15
	Environmental Release Categories: ERC 2, 4
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20 ºC above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Laboratory activities [CS36]. Small scale [CS61]. Handling small quantities (<1000ml) for more than 4 hours/day - inside fume cupboard.	No specific measures identified [EI18].
Cleaning [CS47]. Rolling, Brushing [CS51]. Vessel and container cleaning [CS103] Cleaning equiment, glassware etc under general ventilation for 15 min - 1 hour/day	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].

Section 2.2	**Control of environmental exposure**
Assessment method	EUSES 2.1.1

Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes/year
	Regional tonnage	1.5ktonnes/year
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Releases based on ERC 2 defaults		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.025
	Release fraction to waste water from process before RMM	0.02
	Release fraction to soil from process before RMM	0.0001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 7.02E+03kg/day after RMM	
Substance Use	1.5 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		2
Typical release to water after RMM		3.27E-01 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	

Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.16.2. Exposure estimation

9.16.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene as a laboratory reagent (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.16.2.2. Consumer exposure

Not applicable

9.16.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.16.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.16.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.17 Exposure assessment 17: Use of toluene as a laboratory reagent – Professional

9.17.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in laboratory reagents of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC10, PROC15
	Environmental Release Categories: ERC 4
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20 ºC above ambient , unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Laboratory activities [CS36]. Small scale [CS61]. Handling small quantities (<1000ml) for more than 4 hours/day - inside fume cupboard.	No specific measures identified [EI18].
Cleaning [CS47]. Rolling, Brushing [CS51]. ; Vessel and container cleaning [CS103]Cleaning equiment, glassware etc under general ventilation for 15 min - 1 hour/day	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].

Section 2.2	**Control of environmental exposure**

Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes/year
	Regional tonnage	1.5ktonnes/year
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 8.17.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.5
	Release fraction to waste water from process before RMM	0.5
	Release fraction to soil from process before RMM	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
	TCR 4: Soil emission controls are not applicable as there is no direct release to soil.	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

1

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 2.8E+02kg/day after RMM	
Substance Use	0.003 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		50
Typical release to water after RMM		1.48E-02 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.
Control of Worker Exposure

Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.17.2. Exposure estimation

9.17.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene as a laboratory reagent (proefssional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.17.2.2. Consumer exposure

Not applicable

9.17.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.17.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.17.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.18 Exposure assessment 18: Use of toluene in functional fluids – Industrial

9.18.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in functional fluids of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC 8a, PROC 8b, PROC9
	Environmental Release Categories: ERC7
Processes, tasks, activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]

Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].	No specific measures identified [EI18].
Bulk transfers [CS14]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
Bulk transfers [CS14]. Batch process [CS55].	No specific measures identified [EI18].
Bulk transfers [CS14].	No specific measures identified [EI18].
Drum/batch transfers [CS8]. Dedicated facility [CS81].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
Pelletizing [CS53]. (closed systems) [CS107]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Filling / preparation of equipment from drums or containers. [CS45].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (open systems) [CS16].	No specific measures identified [EI18].
General exposures (open systems) [CS16].	No specific measures identified [EI18].
Remanufacture of reject articles [CS19].	Drain down system prior to equipment break-in or maintenance [E65].
Equipment maintenance [CS5].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]	No specific measures identified [EI18].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes/year
	Regional tonnage	1.5ktonnes/year
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 7.13a.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.01
	Release fraction to waste water from process before RMM	0.0003
	Release fraction to soil from process before RMM	0.001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal	

	efficiency of 93.3%. [TCR 11]
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above	None

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).	
Basis for scaling	Environment
	Risk-driving Compartment – Soil
	Msafe 4.55E+05kg/day after RMM
Substance Use	1.5 ktonnes/year

Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.03
Typical release to water after RMM		6.32E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.18.2. Exposure estimation

9.18.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in functional fluids (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.18.2.2. Consumer exposure

Not applicable

9.18.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.18.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.18.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.19 Exposure assessment 19: Use of toluene in functional fluids – Professional

9.19.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in functional fluids of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC 8a, PROC9, PROC20
	Environmental Release Categories: ERC 9A, ERC 9B
Processes, tasks, activities covered	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Drum/batch transfers [CS8]. Non-dedicated facility [CS82].	Use drum pumps or carefully pour from container [E64].
Transfer from/pouring from containers [CS22].	Use drum pumps or carefully pour from container [E64].
Filling / preparation of equipment from drums or containers. [CS45].	Use drum pumps or carefully pour from container [E64].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. At elevated temperature (product at 80oC)	Handle substance within a predominantly closed system provided with extract ventilation [E49].
Remanufacture of reject articles [CS19].	Drain down system prior to equipment break-in or maintenance [E65].
Equipment maintenance [CS5]. Non-dedicated facility [CS82].	Drain down system prior to equipment break-in or maintenance [E65].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 mg.l^{-1}; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	15ktonnes/year
	Regional tonnage	1.5ktonnes/year
	Fraction of the main local source	2.00E-03
Frequency and duration of use	Emission days per year	365
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 9.13b.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.05
	Release fraction to waste water from process before RMM	0.025
	Release fraction to soil from process before RMM	0.025
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	EEW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**

3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*

1

3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

1

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment	
	Risk-driving Compartment – Freshwater	
	Msafe 2.66E+03kg/day after RMM	
Substance Use	0.003 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		2.5
Typical release to water after RMM		2.10E-03 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.19.2. Exposure estimation

9.19.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in functional fluids (professional) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.19.2.2. Consumer exposure

Not applicable

9.19.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.19.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.19.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.20 Exposure assessment 20: Use of toluene in rubber production and processing – Industrial

9.20.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in rubber manufacturing and processing of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9) Process Categories: PROC1, PROC2, PROC3, PROC4, PROC 5, PROC ^, PROC 7, PROC8a, PROC8b, PROC 13, PROC 14, PROC15, PROC 21 Environmental Release Categories: ERC 4 and 6D
Processes, tasks, activities covered	Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]

0

Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Material transfers [CS3]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
Material transfers [CS3]. Dedicated facility [CS81].	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Bulk weighing [CS91]	No specific measures identified [EI18].
Bulk weighing [CS91]With occasional controlled exposure [CS137]	No specific measures identified [EI18].
Small scale weighing [CS90]	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].

Additive premixing [CS92]	
Material transfers [CS3]. Dedicated facility [CS81].	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Material transfers [CS3].	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Additive premixing [CS92]Batch process [CS55].	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Calendering (including Banburys) [CS64]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
Pressing uncured rubber blanks [CS73]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Vulcanisation [CS70]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Cooling cured articles [CS71]	Provide a good standar of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Laboratory activities [CS36].	No specific measures identified [EI18].
Equipment maintenance [CS5].	Drain or remove substance from equipment prior to break-in or maintenance [E81].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	60ktonnes/year
	Regional Tonnage	6ktonnes/year
	Fraction of the main local source	1
Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 4.19.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process before RMM	0.01
	Release fraction to waste water from process before RMM	0.003

	Release fraction to soil from process before RMM	0.0001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

1

Values for Scaling Purposes

DSU 4 : Further details on scaling and control technologies are provided in SpERC factsheet

(http://cefic.org/en/reach-for-industries-libraries.html).

Basis for scaling	Environment

	Risk-driving Compartment – Soil	
	Msafe 4.67E+05kg/day after RMM	
Substance Use	60 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.3
Typical release to water after RMM		1.97E-01 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.20.2. Exposure estimation

9.20.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use of toluene in rubber production and processing (industrial) were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.20.2.2. Consumer exposure

Not applicable

9.20.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.20.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.20.1 Exposure Scenario: See Appendix

B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.21 Exposure assessment 21: Formulation of toluene

9.21.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Formulation of Toluene;CAS RN108-88-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
	Environmental Release Categories: ERC2
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, large and small scale packing, maintenance and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
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	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient, unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38]
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	No specific measures identified [EI18].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56]. With potential for aerosol generation [CS138].	No specific measures identified [EI18].

Batch processes at elevated temperatures [CS136].	Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54].
Process sampling [CS2].	No specific measures identified [EI18].
Laboratory activities [CS36].	No specific measures identified [EI18].
Bulk transfers [CS14].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11] or Operate activity away from sources of emissions or release [E77], alternatively, if technical measures not practicable [G16] Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (Type EN374) if regular skin contact likely [PPE21]
Mixing operations (open systems) [CS30]. With potential for aerosol generation [CS138].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Manual [CS34]. Transfer from/pouring from containers [CS22].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Drum/batch transfers [CS8].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Production or preparation or articles by tabletting, compression, extrusion or pelletisation [CS100]	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Drum and small package filling [CS6].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].
Storage [CS67]With occasional controlled exposure [CS137]	No specific measures identified [EI18].

Section 2.2	**Control of environmental exposure**	
Assessment method	EUSES 2.1.1	
Product characteristics	Toluene is a liquid of medium volatility. The water solubility is 573 $mg.l^{-1}$; the vapour pressure is 4030 Pa; and the log Kow is 2.73. Toluene is readily biodegradable.	
Amounts used	EU tonnage	150ktonnes/year
	Regional tonnage	15ktonnes/year
	Fraction of the main local source	1

Frequency and duration of use	Emission days per year	300
Environmental Factors not influenced by risk management	Local Freshwater dilution factor	10
	Local marine water dilution factor	100
Conditions given in SPERC fact sheet (ESVOC SpERC 2.2.v1) give rise to following releases fractions		
Other Operational Conditions of use affecting environmental exposure	Release fraction to air from process	0.025
	Release fraction to waste water from process before RMM	0.002
	Release fraction to soil from process before RMM	0.0001
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	TCR 7: Treat air emissions to provide a typical removal efficiency of >0%.	
	Typical onsite wastewater treatment technology provides removal efficiency of 93.3%. [TCR 11]	
Organisation measures to prevent/limit release from site	OMS 2: Do not apply industrial sludge to natural soils.	
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 93.3 (%) [STP3]	
	Assumed domestic sewage treatment plant flow 2000 (m^3/d) [STP5]	
Conditions and measures related to external treatment of waste for disposal	ETW 3: External treatment and disposal of waste should comply with applicable local and/or national regulations.	
Conditions and measures related to external recovery of waste	ERW 1: External recovery and recycling of waste should comply with applicable local and/or national regulations.	
Other environmental control measures additional to above	None	

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
	1
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*

4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 93.3% which would be typically found in waste-water treatment plant.*

Values for Scaling Purposes RC factsheet DSU 4 : Further details on scaling and control technologies are provided in SpE (http://cefic.org/en/reach-for-industries-libraries.html).		
Basis for scaling	Environment	
	Risk-driving Compartment – Soil	
	Msafe 6.78E+04kg/day after RMM	
Site Use	15 ktonnes/year	
Onsite risk management measures	93.3 % efficiency water, 0 % efficiency air	
Dilution factors	Freshwater	10
	Marine water	100
Initial release percent at site to water (before RMM)		0.2
Typical release to water after RMM		3.36E-01 mg/l

Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

9.21.2. Exposure estimation

9.21.2.1. Workers exposure

The worker exposure estimates for the activities associated with the formulation of toluene were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2, used to

model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.21.2.2. Consumer exposure

Not applicable

9.21.2.3. Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. The total daily intakes from exposure via the local environmental are presented in Appendix B.

9.21.2.4. Environmental exposure

The PECs are based on the factors shown in Section 2.2 of 9.21.1 Exposure Scenario: See Appendix B for local PECs and local environmental releases.

For regional PECs see section 9.22.

9.22 Regional Exposure Concentrations

Compartments					
Air (mg/m$^{3)}$	**Fresh water (mg/l)**	**Marine water (mg/l)**	**Fresh water Sediment (mg/kg wwt)**	**Marine water Sediment (mg/kg wwt)**	**Soil (mg/kg wwt) (agricultural)**
5.24E-03	1.44E-03	1.25E-04	7.19E-03	5.7E-04	2.37E-04

9.22 Skin irritation (R38) qualitative assessment

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.

9.23 Aspiration hazard (R65) qualitative assessment

_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.