

## EXPOSURE SCENARIO

according to Regulation (EC) No1907/2006 of the European Parliament and of the Council

### Annex to the safety data sheet Diethyl ether

Date of Publication: 15.2.2013

Date of Revision: 20.7.2021

Revision: 1

#### Exposure scenarios for Diethyl ether:

ES No.	Exposure Scenario
1	Manufacture and Industrial Use
2	Distribution of Substance – Industrial
3	Manufacture of Smokeless Gunpowder – Professional
4	Use in Laboratories – Industrial
5	Use in Laboratories – Professional
6	Use in Fuels – Industrial
7	Use in Fuels – Professional
8	Use in Fuels – Consumer

ES No.	Manufacture	Identified use			SU	PC	PROC	ERC
		Formulation	End use	Consumer use				
1	X				3, 8, 9	-	1, 2, 3, 4, 8a, 8b, 15	1, 4, 6a
2	X				3, 8, 9	-	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2
3			X		22	-	1, 3, 5, 8a, 8b	8d
4		X			3	-	10, 15	2, 4
5			X		22	-	10, 15	8a
6		X	X		3, 10	-	1, 2, 3, 7, 8a, 8b, 16	2
7			X		22	-	7, 16	8d
8			X		21	13	-	8d

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## ES 1 Manufacture and Industrial Use

1. Title of exposure scenario	
Title	Manufacture and industrial use of diethyl ether
Sector of use	Industrial (SU3, SU8, SU9)
Process category	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC15: Use as laboratory reagent
Product category	-
Environmental release category	ERC1, ERC4, ERC6a
Processes, tasks, activities covered	Manufacture of the substance or use as an intermediate or a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing scenarios	
Risk management measures	
General exposures (closed systems) [CS15]	Handle substance within a closed system. [E47] No other specific measures identified. [E120]
General exposures (open systems) [CS16]	Handle substance within a closed system. [E47] Provide a good standard of controlled ventilation (10 to 15 air changes per hour). [E40] Clear transfer lines prior to decoupling. [E39]
Process sampling [CS2]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). [E40]
Laboratory activities [CS36]	No specific measures identified. [E118]
Bulk transfers [CS14], (open systems) [CS108]	Handle substance within a closed system. [E47] Provide extract ventilation to points where emissions occur. [E54] Clear transfer lines prior to decoupling. [E39]
Bulk transfers [CS14], (closed systems) [CS107]	Provide extract ventilation to material transfer points and other openings. [E82] Clear transfer lines prior to decoupling. [E39]
Equipment cleaning and maintenance [CS39]	Drain down system prior to equipment break-in or maintenance. [E65]

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Storage [CS67]	Store substance within a closed system. [E84] Transfer via enclosed lines. [E52] Locate bulk storage outdoors. [E2]				
<b>2.2 Control of environmental exposure</b>					
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.				
Amounts used	Regional use tonnage (tonnes/year): 3 000 [A2]				
Frequency and duration of use	Continuous release (300 days/year). [FD2]				
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]				
Other given operational conditions affecting environmental exposure	Local release to sewage was measured to be 0.0003 and was taken into account for calculations in section 10; spERC ESVOC 1 has been used as basis for the risk assessment performed.				
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]				
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]				
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]				
Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]				
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.				
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]				
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]				
<b>3. Exposure estimation</b>					
<b>3.1 Health</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Risk characterisation ratio (RCR) for exposure of workers</b>					
Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU8/9/3	General exposures (no sampling)	PROC1	0.00	0.01	0.01
SU8/9/3	General exposures and sample collection	PROC2	0.49	0.03	0.52
SU8/9/3	General exposures	PROC3	0.98	0.01	0.99
SU8/9/3	General exposures, open batch process	PROC4	0.30	0.16	0.45
SU8/9/3	Sample collection	PROC8b	0.44	0.16	0.60
SU8/9/3	Laboratory activities	PROC15	0.49	0.01	0.50
SU8/9/3	Bulk transfers (no LEV)	PROC8b	0.15	0.02	0.16
SU8/9/3	Open bulk transfers (aerosols)	PROC8b	0.05	0.16	0.20
SU8/9/3	Bulk transfers (with LEV)	PROC8b	0.15	0.02	0.16
SU8/9/3	Clean down and maintenance	PROC8a	0.49	0.31	0.80

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SU3/10	Storage	PROC1/2	0.10	0.03	0.13
<b>3.2 Environment</b>					
<p>Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.</p>					
<b>Parameters for environment</b>					
<b>Environmental compartments</b>	<b>PEC</b>	<b>PNEC</b>	<b>PEC/PNEC</b>		
Freshwater (mg/l)	0.002762	2.0	0.001381		
Marine water (mg/l)	0.000239	0.2	0.001194		
Freshwater sediment (mg/kg dwt)	0.012641	9.14	0.001383		
Marine water sediment (mg/kg dwt)	0.001039	0.91	0.001194		
Local soil (mg/kg dwt)	0.002070	0.66	0.003136		
Sewage treatment plant (mg/l)	0	4.2	0		
<p>PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration</p>					
<b>4. Guidance to check compliance with the exposure scenario</b>					
<b>4.1 Health</b>					
<p>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]</p>					
<b>4.2 Environment</b>					
<p>Used ECETOC TRA model. [EE1] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]</p>					

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## ES 2 Distribution of Substance – Industrial

1. Title of exposure scenario	
Title	Distribution of diethyl ether
Sector of use	Industrial (SU3, SU8, SU9)
Process category	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Chemical production where opportunity for exposure arises PROC8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Product category	-
Environmental release category	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 sampling, storage, unloading, distribution and associated laboratory activities.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing scenarios	Risk management measures
General exposures (closed systems) [CS15]	Handle substance within a closed system. [E47] No other specific measures identified. [E120]
General exposures (open systems) [CS16]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). [E40] Clear transfer lines prior to decoupling. [E39]
Process sampling [CS2]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). [E40]
Laboratory activities [CS36]	No specific measures identified. [E118]
Bulk transfers [CS14], (open systems) [CS108]	Ensure material transfers are under containment or extract ventilation. [E66] Clear transfer lines prior to decoupling. [E39]
Bulk transfers [CS14], (closed systems) [CS107]	Ensure material transfers are under containment or extract ventilation. [E66] Clear transfer lines prior to decoupling. [E39]
Drum and small package filling [CS6]	Fill containers/cans at designated filling points supplied with local ventilation. [E51]
Equipment cleaning and	Drain down system prior to equipment break-in or maintenance. [E65]

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maintenance [CS39]					
Storage [CS67]	Store substance within a closed system. [E84] Transfer via enclosed lines. [E52] Locate bulk storage outdoors. [E2]				
<b>2.2 Control of environmental exposure</b>					
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.				
Amounts used	Regional use tonnage (tonnes/year): 1 500 [A2]				
Frequency and duration of use	Continuous release (300 days/year). [FD2]				
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]				
Other given operational conditions affecting environmental exposure	spERC ESVOG 3 has been used as basis for the risk assessment performed.				
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]				
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]				
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]				
Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]				
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.				
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]				
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]				
<b>3. Exposure estimation</b>					
<b>3.1 Health</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Risk characterisation ratio (RCR) for exposure of workers</b>					
Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU3	General exposures, closed process (e.g. in-line additive dosing equipment, in-line filter cleaning; pipeline transfers)	PROC1	0.00	0.01	0.01
SU3	General exposures (occasional controlled exposure)	PROC2	0.49	0.03	0.52
SU3	General exposures, closed batch process	PROC3	0.98	0.01	0.99
SU3	General exposures, open batch process	PROC4	0.30	0.16	0.45
SU3	Sample collection	PROC3	0.30	0.01	0.30
SU3	Laboratory activities	PROC15	0.49	0.01	0.50
SU3	Bulk closed loading and unloading (e.g. road/rail car bottom loading/unloading; marine vessel/barge loading/unloading)	PROC8b	0.15	0.02	0.16

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SU3	Bulk open loading (e.g. road/rail car top loading, may involve LEV)	PROC8b	0.15	0.02	0.16
SU3	Drum and small package filling	PROC9	0.20	0.02	0.21
SU3	Clean down and maintenance	PROC8a	0.49	0.06	0.55
SU3	Storage	PROC1/2	0.10	0.00	0.10

### 3.2 Environment

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

#### Parameters for environment

Environmental compartments	PEC	PNEC	PEC/PNEC
Freshwater (mg/l)	0.002765	2.0	0.001382
Marine water (mg/l)	0.000239	0.2	0.001195
Freshwater sediment (mg/kg dwt)	0.012654	9.14	0.001384
Marine water sediment (mg/kg dwt)	0.001094	0.91	0.001202
Local soil (mg/kg dwt)	0.000009	0.66	0.000014
Sewage treatment plant (mg/l)	0.000029	4.2	0.000007

PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration

### 4. Guidance to check compliance with the exposure scenario

#### 4.1 Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

#### 4.2 Environment

Used ECETOC TRA model. [EE1]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

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### ES 3 Manufacture of Smokeless Gunpowder – Professional

1. Title of exposure scenario	
Title	Manufacture of smokeless gunpowder
Sector of use	Professional (SU22)
Process category	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
Product category	-
Environmental release category	ERC8d
Processes, tasks, activities covered	Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing scenarios	
Risk management measures	
Bulk transfers [CS14]	Handle substance within a closed system. [E47] No other specific measures identified. [E120]
Drum/batch transfers [CS8]	Use drum pumps. [E53] Wear suitable gloves tested to EN 374. [PPE15] Avoid carrying out operation for more than 4 hours. [OC12] Avoid spillage when withdrawing pump. [C&H16]
Mixing/blending [CS23], (closed systems) [CS107]	No specific measures identified. [E118]
Mixing/blending [CS23], (open systems) [CS108]	Wear suitable respiratory protection (conforming to EN 140 with type A filter or better) and gloves (tested to EN 374) if regular skin contact likely. [PPE21]
Material transfers [CS3]	Wear suitable gloves tested to EN 374. [PPE15] Avoid carrying out operation for more than 1 hour. [OC11] Ensure operation is undertaken outdoors. [E69]
Transfer from/pouring from containers [CS22], non-dedicated facility [CS82]	Use drum pumps. [E53] Wear suitable gloves tested to EN 374. [PPE15] Avoid carrying out operation for more than 4 hours. [OC12] Avoid spillage when withdrawing pump. [C&H16]
Operation of equipment containing engine oils and similar [CS26]	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]



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	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11] Wear suitable gloves tested to EN 374. [PPE15] Retain drain downs in sealed storage pending disposal or for subsequent recycle. [ENVT4]
Storage [CS67]	Store substance within a closed system. [E84] Ensure operation is undertaken outdoors. [E69]

## 2.2 Control of environmental exposure

Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.
Amounts used	Regional use tonnage (tonnes/year): 900 [A2]
Frequency and duration of use	Continuous release (365 days/year). [FD2]
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]
Other given operational conditions affecting environmental exposure	ERC8d default has been used as basis for the risk assessment performed.
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]

## 3. Exposure estimation

### 3.1 Health

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

#### Risk characterisation ratio (RCR) for exposure of workers

Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU22	Bulk transfers from road tankers	PROC3	0.98	0.01	0.99
SU22	Charge from drums	PROC8a	0.59	0.06	0.65
SU22	Mixing/blending	PROC3	0.98	0.01	0.99
SU22	Mixing/blending (open process)	PROC5	0.49	0.06	0.55
SU22	Bulk transfers of explosive slurry	PROC8a	0.69	0.06	0.75
SU22	Transfer of slurry from containers	PROC8a	0.59	0.06	0.65
SU22	Vessel/container cleaning	PROC8b	0.49	0.16	0.65
SU22	Equipment maintenance	PROC8a	0.69	0.06	0.75

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SU22	Storage	PROC1/2	0.34	0.03	0.38																												
<b>3.2 Environment</b>																																	
<p>Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.</p>																																	
<b>Parameters for environment</b>																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Environmental compartments</th> <th style="width: 15%;">PEC</th> <th style="width: 15%;">PNEC</th> <th style="width: 30%;">PEC/PNEC</th> </tr> </thead> <tbody> <tr> <td>Freshwater (mg/l)</td> <td>0.144895</td> <td>2.0</td> <td>0.072448</td> </tr> <tr> <td>Marine water (mg/l)</td> <td>0.014452</td> <td>0.2</td> <td>0.072261</td> </tr> <tr> <td>Freshwater sediment (mg/kg dwt)</td> <td>0.663221</td> <td>9.14</td> <td>0.072562</td> </tr> <tr> <td>Marine water sediment (mg/kg dwt)</td> <td>0.006615</td> <td>0.91</td> <td>0.072693</td> </tr> <tr> <td>Local soil (mg/kg dwt)</td> <td>0.010460</td> <td>0.66</td> <td>0.015848</td> </tr> <tr> <td>Sewage treatment plant (mg/l)</td> <td>1.421358</td> <td>4.2</td> <td>0.338419</td> </tr> </tbody> </table>						Environmental compartments	PEC	PNEC	PEC/PNEC	Freshwater (mg/l)	0.144895	2.0	0.072448	Marine water (mg/l)	0.014452	0.2	0.072261	Freshwater sediment (mg/kg dwt)	0.663221	9.14	0.072562	Marine water sediment (mg/kg dwt)	0.006615	0.91	0.072693	Local soil (mg/kg dwt)	0.010460	0.66	0.015848	Sewage treatment plant (mg/l)	1.421358	4.2	0.338419
Environmental compartments	PEC	PNEC	PEC/PNEC																														
Freshwater (mg/l)	0.144895	2.0	0.072448																														
Marine water (mg/l)	0.014452	0.2	0.072261																														
Freshwater sediment (mg/kg dwt)	0.663221	9.14	0.072562																														
Marine water sediment (mg/kg dwt)	0.006615	0.91	0.072693																														
Local soil (mg/kg dwt)	0.010460	0.66	0.015848																														
Sewage treatment plant (mg/l)	1.421358	4.2	0.338419																														
<p>PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration</p>																																	
<b>4. Guidance to check compliance with the exposure scenario</b>																																	
<b>4.1 Health</b>																																	
<p>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]</p>																																	
<b>4.2 Environment</b>																																	
<p>Used ECETOC TRA model. [EE1] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]</p>																																	

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#### ES 4 Use in Laboratories – Industrial

1. Title of exposure scenario	
Title	Use of diethyl ether in laboratories – industrial
Sector of Use	Industrial (SU3)
Process Category	PROC10: Roller application or brushing PROC15: Use as laboratory reagent
Product category	-
Environmental Release Category	ERC2, (ERC4)
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing Scenarios	
Risk management measures	
Laboratory activities [CS36]	Carefully pour from containers. [E62] Put lids (caps) on containers (bottles) immediately after use. [E9]
Cleaning [CS47]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour). [E40] Ensure ventilation system is regularly maintained and tested. [E74] Carefully pour from containers. [E62] Put lids (caps) on containers (bottles) immediately after use. [E9] Wear suitable gloves tested to EN 374. [PPE15]
2.2 Control of environmental exposure	
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.
Amounts used	Regional use tonnage (tonnes/year): 3 [A2]
Frequency and duration of use	Emission days (days/year): 20 [FD4]
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]
Other given operational conditions affecting environmental exposure	spERC ESVOC 38 has been used as basis for the risk assessment performed.
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]

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Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]				
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.				
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]				
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]				
<b>3. Exposure estimation</b>					
<b>3.1 Health</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Risk characterisation ratio (RCR) for exposure of workers</b>					
<b>Sector of use</b>	<b>Description of task</b>	<b>PROC/PC</b>	<b>RCR inhalative</b>	<b>RCR dermal</b>	<b>RCR combined</b>
SU3/8	Laboratory activities	PROC15	0.49	0.01	0.50
SU3/8	Cleaning (wiping, brushing, flushing)	PROC10	0.74	0.12	0.86
<b>3.2 Environment</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Parameters for environment</b>					
<b>Environmental compartments</b>	<b>PEC</b>	<b>PNEC</b>	<b>PEC/PNEC</b>		
Freshwater (mg/l)	0.060405	2.0	0.030202		
Marine water (mg/l)	0.006003	0.2	0.030015		
Freshwater sediment (mg/kg dwt)	0.276487	9.14	0.030250		
Marine water sediment (mg/kg dwt)	0.027477	0.91	0.030195		
Local soil (mg/kg dwt)	0.004156	0.66	0.006297		
Sewage treatment plant (mg/l)	0.576440	4.2	0.137248		
PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration					
<b>4. Guidance to check compliance with the exposure scenario</b>					
<b>4.1 Health</b>					
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]					
<b>4.2 Environment</b>					
Used ECETOC TRA model. [EE1] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]					

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### ES 5 Use in Laboratories – Professional

1. Title of exposure scenario	
Title	Use of diethyl ether in laboratories – professional
Sector of Use	Professional (SU22)
Process Category	PROC10: Roller application or brushing PROC15: Use as laboratory reagent
Product category	-
Environmental Release Category	ERC8a
Processes, tasks, activities covered	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing Scenarios	
Risk management measures	
Laboratory activities [CS36]	Carefully pour from containers. [E62] Put lids (caps) on containers (bottles) immediately after use. [E9]
Cleaning [CS47]	Handle in a fume cupboard or under extract ventilation. [E83] Ensure ventilation system is regularly maintained and tested. [E74] Carefully pour from containers. [E62] Put lids (caps) on containers (bottles) immediately after use. [E9] Wear suitable gloves tested to EN 374. [PPE15]
2.2 Control of environmental exposure	
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.
Amounts used	Regional use tonnage (tonnes/year): 3 [A2]
Frequency and duration of use	Continuous release (365 days/year). [FD2]
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]
Other given operational conditions affecting environmental exposure	ERC8a default has been used as basis for the risk assessment performed.
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]

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Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]				
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.				
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]				
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]				
<b>3. Exposure estimation</b>					
<b>3.1 Health</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Risk characterisation ratio (RCR) for exposure of workers</b>					
Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU22	Laboratory activities	PROC15	0.49	0.01	0.50
SU22	Cleaning (wiping, brushing, flushing)	PROC10	0.74	0.12	0.86
<b>3.2 Environment</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Parameters for environment</b>					
Environmental compartments	PEC	PNEC	PEC/PNEC		
Freshwater (mg/l)	0.007499	2.0	0.003750		
Marine water (mg/l)	0.000713	0.2	0.003563		
Freshwater sediment (mg/kg dwt)	0.034327	9.14	0.003756		
Marine water sediment (mg/kg dwt)	0.003261	0.91	0.003261		
Local soil (mg/kg dwt)	0.000357	0.66	0.000541		
Sewage treatment plant (mg/l)	0.047379	4.2	0.011281		
PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration					
<b>4. Guidance to check compliance with the Exposure Scenario</b>					
<b>4.1 Health</b>					
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]					
<b>4.2 Environment</b>					
Used ECETOC TRA model. [EE1] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]					

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## ES 6 Use in Fuels – Industrial

1. Title of exposure scenario	
Title	Use of diethyl ether in fuels – industrial
Sector of use	Industrial (SU3)
Process category	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC7: Industrial spraying PROC8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16: Use of fuels
Product category	-
Environmental release category	ERC2
Processes, tasks, activities covered	Industrial formulation of fuels and use as fuel in industrial setting as engine starter.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing scenarios	
Risk management measures	
Bulk transfers [CS14]	Provide extract ventilation to points where emissions occur. [E54] Wear suitable gloves tested to EN 374. [PPE15]
Drum/batch transfers [CS8]	Provide extract ventilation to points where emissions occur. [E54] Wear suitable gloves tested to EN 374. [PPE15]
General exposures (closed systems) [CS15]	Provide extract ventilation to points where emissions occur. [E54] Retain drain downs in sealed storage pending disposal or for subsequent recycle. [ENVT4]
Use as fuel (closed systems) [GES16, CS107]	Provide extract ventilation to points where emissions occur. [E54]
Use as fuel additive diluent (closed systems) [GES16, CS107]	Provide extract ventilation to points where emissions occur. [E54]
Equipment cleaning and maintenance [CS39]	Provide extract ventilation to points where emissions occur. [E54] Wear suitable gloves tested to EN 374. [PPE15]
Vessel and container cleaning [CS103]	Provide extract ventilation to points where emissions occur. [E54] Wear suitable gloves tested to EN 374. [PPE15]
Starting frozen engine	Provide extract ventilation to points where emissions occur. [E54] Wear suitable gloves tested to EN 374. [PPE15]

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Storage [CS67]	Ensure operation is undertaken outdoors. [E69]				
<b>2.2 Control of environmental exposure</b>					
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.				
Amounts used	Regional use tonnage (tonnes/year): 150 [A2]				
Frequency and duration of use	Continuous release (365 days/year). [FD2]				
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 1 [A1]				
Other given operational conditions affecting environmental exposure	Local release to sewage was measured to be 0.0003 and was taken into account for calculations in section 10; spERC ESVOC 1 has been used as basis for the risk assessment performed.				
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]				
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]				
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]				
Organizational measures to prevent/limit release from site	Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]				
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.				
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]				
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]				
<b>3. Exposure estimation</b>					
<b>3.1 Health</b>					
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.					
<b>Risk characterisation ratio (RCR) for exposure of workers</b>					
Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU3	Bulk transfers (barge, rail and road)	PROC8b	0.05	0.03	0.08
SU3	Transfers from drums and containers	PROC8b	0.05	0.03	0.08
SU3	General exposures, closed process (e.g. in-line additive dosing equipment, in-line filter cleaning)	PROC1/2	0.10	0.30	0.13
SU3	General exposures, closed batch process (e.g. in-line additive dosing equipment)	PROC3	0.00	0.00	0.00
SU3	General use exposures as a fuel	PROC1/2	0.01	0.03	0.04
SU3	Use as fuel (closed systems)	PROC16	0.00	0.00	0.01
SU3	Use as fuel additive diluent (closed systems)	PROC3	0.02	0.01	0.03
SU3	Vehicle/boiler maintenance	PROC8a	0.05	0.03	0.08
SU3	Cleaning fuel storage tanks	PROC8a	0.05	0.03	0.08



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SU3	Starting frozen engine	PROC7	0.49	0.13	0.62
SU3	Storage	PROC1/2	0.07	0.00	0.07

### 3.2 Environment

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

#### Parameters for environment

Environmental compartments	PEC	PNEC	PEC/PNEC
Freshwater (mg/l)	0.0749	2.0	0.0375
Marine water (mg/l)	0.0075	0.2	0.0373
Freshwater sediment (mg/kg dwt)	0.3429	9.14	0.0375
Marine water sediment (mg/kg dwt)	0.0341	0.91	0.0375
Local soil (mg/kg dwt)	0.0067	0.66	0.0102
Sewage treatment plant (mg/l)	0.7205	4.2	0.1716

PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration

### 4. Guidance to check compliance with the exposure scenario

#### 4.1 Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

#### 4.2 Environment

Used ECETOC TRA model. [EE1]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

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### ES 7 Use in Fuels – Professional

1. Title of exposure scenario	
Title	Use of diethyl ether in fuels – professional
Sector of use	Professional (SU22)
Process category	PROC7: Industrial spraying PROC16: Use of fuels
Product category	-
Environmental release category	ERC8d
Processes, tasks, activities covered	Use of small quantities in car repair garage settings and at gasoline stations to start frozen engines.
2. Operational conditions and risk management measures	
2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Covers percentage substance in the product up to 100 %. [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.
Contributing scenarios	
Risk management measures	
Starting frozen engine	Avoid carrying out activities involving exposure for more than 5 minutes. Covers skin contact area up to 35.7 cm <sup>2</sup> . [ConsOC5]
Use as fuel (closed systems) [GES16, CS107]	Provide extract ventilation to points where emissions occur. [E54]
2.2 Control of environmental exposure	
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.
Amounts used	Regional use tonnage (tonnes/year): 150 [A2]
Frequency and duration of use	Continuous release (365 days/year). [FD2] Daily < 5 min/application to start frozen engine, concentration max. 70 %.
Environment factors not influenced by risk management	Fraction of EU tonnage used in region: 0.1 [A1]
Other given operational conditions affecting environmental exposure	ERC8d default has been used as basis for the risk assessment performed.
Technical onsite conditions and measures to reduce or limit discharges to wastewater	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. [TCR9]
Technical onsite conditions and measures to reduce or limit air emissions	Volatile compounds subject to air emission controls. [OOC18]
Technical onsite conditions and measures to reduce or limit releases to soil	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
Organizational measures to	Prevent discharge of undissolved substance to or recover from onsite wastewater.

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prevent/limit release from site	[TCR14]
Conditions and measures related to municipal sewage treatment plant	See technical on-site condition above.
Conditions and measures related to external treatment of waste for disposal	Prevent environmental discharge consistent with regulatory requirements. [OMS4]
Conditions and measures related to external recovery of waste	Allow volatiles to evaporate. Dispose of solid residue according to applicable regulations. [OMS5]

### 3. Exposure estimation

#### 3.1 Health

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

#### Risk characterisation ratio (RCR) for exposure of workers

Sector of use	Description of task	PROC/PC	RCR inhalative	RCR dermal	RCR combined
SU22	Starting frozen engine	PROC7	0.49	0.13	0.62
SU22	Use as fuel (closed process)	PROC16	0.02	0.00	0.02

#### 3.2 Environment

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

#### Parameters for environment

Environmental compartments	PEC	PNEC	PEC/PNEC
Freshwater (mg/l)	0.0070	2.0	0.0035
Marine water (mg/l)	0.0007	0.2	0.0033
Freshwater sediment (mg/kg dwt)	0.0319	9.14	0.0035
Marine water sediment (mg/kg dwt)	0.0030	0.91	0.0033
Local soil (mg/kg dwt)	0.0000	0.66	0.0000
Sewage treatment plant (mg/l)	0.0000	4.2	0.0000

PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration

### 4. Guidance to check compliance with the exposure scenario

#### 4.1 Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

#### 4.2 Environment

Used ECETOC TRA model. [EE1]  
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]

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### ES 8 Use in Fuels – Consumer

1. Title of exposure scenario	
Title	Use of diethyl ether in fuels – consumer
Sector of use	Consumer (SU21)
Product category	PC13: Fuels
Environmental release category	ERC8d
Processes, tasks, activities covered	Covers consumer uses in liquid fuels.
2. Operational conditions and risk management measures	
2.1 Control of consumer exposure	
Product characteristics	
Physical form of product	Liquid
Vapour pressure	71 600 Pa
Concentration of substance in product	Cover concentrations up to 70 %. [ConsOC1]
Amounts used	For each use event, covers use amounts up to 30 g. [ConsOC2]
Frequency and duration of use	Covers use up to 1 time/on day of use. [ConsOC4] Covers exposure up to 3 minutes per event. [ConsOC14]
Other given operational conditions affecting consumers exposure	Assumes use at ambient temperatures. [ConsOC15] Assumes use outdoors (100 m <sup>3</sup> room).
Product category	Operational conditions (OC)/Risk management measures (RMM)
PC13 Fuels – liquid: Automotive refuelling	OC Covers use up to 52 days/year. [ConsOC3] Covers skin contact area up to 35.7 cm <sup>2</sup> . [ConsOC5] Covers outdoor use. [ConsOC12] For each use event, covers exposure up to 0.05 h/event. [ConsOC14]
	RMM No specific risk management measure identified beyond those operational conditions stated.
PC13 Fuels – liquid: Scooter refuelling	OC Covers use up to 52 days/year. [ConsOC3] Covers skin contact area up to 35.7 cm <sup>2</sup> . [ConsOC5] Covers outdoor use. [ConsOC12] For each use event, covers exposure up to 0.03 h/event. [ConsOC14]
	RMM No specific risk management measure identified beyond those operational conditions stated.
PC13 Fuels – liquid: Garden equipment - refuelling	OC Covers use up to 52 days/year. [ConsOC3] Covers skin contact area up to 35.7 cm <sup>2</sup> . [ConsOC5] Covers outdoor use. [ConsOC12] For each use event, covers exposure up to 0.03 h/event. [ConsOC14]
	RMM No specific risk management measure identified beyond those operational conditions stated.
2.2 Control of environmental exposure	
Product characteristics	Diethyl ether belongs to chemical class of ethers, being highly volatile, but not readily biodegradable in aqueous media but very rapidly eliminated by hydroxyl radical reaction in air.
Amounts used	Fraction of EU tonnage used in region: 0.1 [A1] Regional use tonnage (tonnes/year): default ERC8d values Annual site tonnage (tonnes/year): 150
Frequency and duration of use	See ERC8d default values.
Environment factors not influenced by risk management	Not applicable.

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Other given operational conditions affecting environmental exposure	ERC8d default has been used as basis for the risk assessment performed.					
<b>3. Exposure estimation</b>						
<b>3.1 Health</b>						
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.						
<b>Risk characterisation ratio (RCR) for exposure of consumers</b>						
<b>Sector of use</b>	<b>Description of task</b>	<b>PROC/PC</b>	<b>RCR dermal</b>	<b>RCR oral</b>	<b>RCR inhalative</b>	<b>RCR combined</b>
SU21	Automotive refuelling	PC13	0.04	0.00	0.00	0.04
SU21	Scooter refuelling	PC13	0.04	0.00	0.00	0.04
SU21	Garden equipment – refueling	PC13	0.02	0.00	0.00	0.02
<b>3.2 Environment</b>						
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.						
<b>Parameters for environment</b>						
<b>Environmental compartments</b>	<b>PEC</b>	<b>PNEC</b>	<b>PEC/PNEC</b>			
Freshwater (mg/l)	0.0070	2.0	0.0035			
Marine water (mg/l)	0.0007	0.2	0.0033			
Freshwater sediment (mg/kg dwt)	0.0319	9.14	0.0035			
Marine water sediment (mg/kg dwt)	0.0030	0.91	0.0033			
Local soil (mg/kg dwt)	0.0000	0.66	0.0000			
Sewage treatment plant (mg/l)	0.0000	4.2	0.0000			
PEC = Predicted Environmental Concentration; PNEC = Predicted No Effect Concentration						
<b>4. Guidance to check compliance with the exposure scenario</b>						
<b>4.1 Health</b>						
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. [G21] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]						
<b>4.2 Environment</b>						
Used ECETOC TRA model. [EE1] Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [G23]						