

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

tetrachloroethylene

Version 3.0

Print Date 28.08.2017

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Distribution of substance	3	NA	NA	2, 3, 8a, 8b, 9, 15	2	NA	ES5216
2	Formulation & (re)packing of substances and mixtures	3	NA	NA	1, 2, 3, 4, 8a, 8b, 9, 15	2	NA	ES18562
3	Use in dry cleaning	3	NA	NA	2, 4, 6, 8a, 8b	4	NA	ES5225
4	Use in dry cleaning	22	NA	NA	2, 4, 8a, 8b	8a, 8d	NA	ES5234
5	Use in surface cleaning	3	NA	NA	1, 3, 8a, 8b	7	NA	ES5240
6	Use in heat transfer and hydraulic fluids	3	NA	NA	1, 3, 8a	7	NA	ES5242
7	Use as a maskant, medium scale	3	NA	NA	1, 2, 3, 4, 7, 8a, 8b, 10, 13, 15	4	NA	ES18564
8	Use as a maskant, large scale	3	NA	NA	1, 2, 3, 7, 8a, 8b, 10, 13, 15	4	NA	ES18566



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1. Short title of Exposure Scenario 1: Distribution of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used	Amounts used in the EU (tonnes/year)	32000 ton(s)/year
	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,002
	Maximum daily site tonnage (kg/day):	210 kg/day
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	1 .10-4
	Emission or Release Factor: Water	1 .10-5
	Emission or Release Factor: Soil	1 .10-5
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Prevent discharge of undissolved substance to or recover from onsite wastewater.
	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Degradation efficiency	92,6 %



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	Percentage removed from waste water	92,6 %
	Sludge Treatment	Do not use sludge as fertiliser
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Recovery Methods	Storage of finished products in closed containers.
	Recovery Methods	Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	1 hours/day(PROC8b)
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Bulk transfers Dedicated facility	Avoid carrying out operation for more than 1 hour.(PROC8b)
	Drum/batch transfers Dedicated facility	Avoid carrying out operation for more than 1 hour.(PROC8b)
	Drum and small package filling Dedicated facility	Ensure material transfers are under containment or extract ventilation.(PROC9)
	Process sampling Closed systems	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC3)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.(PROC8a)
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.	

3. Exposure estimation and reference to its source

Environment

ERC2: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,0194µg/L	0,00038
ERC2	---	Marine water	PEC	0,0020µg/L	0,000398
ERC2	---	Fresh water sediment	PEC	0,343µg/kg dry weight (d.w.)	0,00038

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ERC2	---	Marine sediment	PEC	0,036µg/kg dry weight (d.w.)	0,000398
ERC2	---	Agricultural soil	PEC	0,169µg/kg dry weight (d.w.)	0,0169
ERC2	---	Sewage treatment plant (STP)	PEC	0,0791µg/L	0,000007

ESVOC spERC 1.1b.v1 has been used to evaluate the exposure for the environment.

Workers

PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Worker - inhalative, long-term - systemic	69,08mg/m ³	0,5
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg/day	0,03
PROC3	---	Worker - inhalative, long-term - systemic	120,9mg/m ³	0,88
PROC3	---	Worker - dermal, long-term - systemic	0,34mg/kg/day	0,01
PROC8a	---	Worker - inhalative, long-term - systemic	69,08mg/m ³	0,50
PROC8a	---	Worker - dermal, long-term - systemic	13,71mg/kg/day	0,35
PROC8b	---	Worker - inhalative, long-term - systemic	69,08mg/m ³	0,5
PROC8b	---	Worker - dermal, long-term - systemic	6,86mg/kg/day	0,17
PROC9	---	Worker - inhalative, long-term - systemic	34,54mg/m ³	0,25
PROC9	---	Worker - dermal, long-term - systemic	6,86mg/kg/day	0,17
PROC15	---	Worker - inhalative, long-term - systemic	69,08mg/m ³	0,5
PROC15	---	Worker - dermal, long-term - systemic	0,34mg/kg/day	0,01

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>



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Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

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1. Short title of Exposure Scenario 2: Formulation & (re)packing of substances and mixtures

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15: Use as laboratory reagent</p>
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used	Daily amount per site	5000 kg/day
Frequency and duration of use	Continuous exposure	60 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,015 %
	Emission or Release Factor: Water	0,0001 %
	Emission or Release Factor: Soil	0,0001 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 98,5 %)
	Use vapour recovery units when necessary. Store finished products in closed containers (e.g., bulk tanks, drums, cans).	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations., Dispose of waste or used sacks/containers according to local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4,



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PROC8a, PROC8b, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Closed systems	Handle substance within a closed system.(PROC1)
	General exposures (closed systems) Continuous process With sample collection	Handle substance within a closed system.(PROC2)
	General exposures (closed systems) Continuous process With sample collection Elevated temperature	Handle substance within a closed system. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC2)
	General exposures (closed systems) Use in contained batch processes	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system.(PROC3)
	General exposures (open systems)	Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC4)
	General exposures (open systems) Elevated temperature	Provide extract ventilation to points where emissions occur. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC4)
	Transfer from/pouring from containers Manual	Provide extract ventilation to material transfer points and other openings.(PROC8a)
	Transfer from/pouring from containers Manual Elevated temperature	Provide extract ventilation to material transfer points and other openings. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC8a)
	Drum/batch transfers Bulk transfers Process sampling	Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC8b)
	Drum and small package filling Dedicated facility	Fill containers/cans at dedicated filling points supplied with local extract ventilation.(PROC9)
	Drum and small package filling Dedicated facility Elevated temperature	Fill containers/cans at dedicated filling points supplied with local extract ventilation. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC9)



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	Laboratory activities	Handle substance within a closed system.(PROC15)
Conditions and measures related to personal protection, hygiene and health evaluation	General exposures (closed systems) Continuous process With sample collection	Wear suitable gloves tested to EN374.(PROC2)
	General exposures (closed systems) Continuous process With sample collection Elevated temperature	Wear suitable gloves tested to EN374.(PROC2)
	General exposures (closed systems) Use in contained batch processes	Wear suitable gloves tested to EN374.(PROC3)
	General exposures (open systems)	Wear suitable gloves tested to EN374.(PROC4)
	General exposures (open systems) Elevated temperature	Wear suitable gloves tested to EN374.(PROC4)
	Transfer from/pouring from containers Manual	Wear suitable gloves tested to EN374.(PROC8a)
	Equipment cleaning and maintenance	Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.(PROC8a)
	Transfer from/pouring from containers Manual Elevated temperature	Wear suitable gloves tested to EN374.(PROC8a)
	Drum/batch transfers Bulk transfers Process sampling	Wear suitable gloves tested to EN374.(PROC8b)
	Drum and small package filling Dedicated facility	Wear suitable gloves tested to EN374.(PROC9)
	Drum and small package filling Dedicated facility Elevated temperature	Wear suitable gloves tested to EN374.(PROC9)

3. Exposure estimation and reference to its source

Environment

ERC2: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,025mg/L	0,49

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ERC2	---	Marine water	PEC	0,0025mg/L	0,49
ERC2	---	Fresh water sediment	PEC	0,44mg/kg dry weight (d.w.)	0,49
ERC2	---	Marine sediment	PEC	0,044mg/kg dry weight (d.w.)	0,49
ERC2	---	Agricultural soil	PEC	0,0097mg/kg dry weight (d.w.)	0,86

ESVOC spERC 2.2.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - systemic	0,07mg/m ³	0,001
PROC1	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	0,001
PROC2	General exposures (closed systems), Continuous process, With sample collection	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC2	General exposures (closed systems), Continuous process, With sample collection, Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC2	---	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,007
PROC3	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC3	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,004
PROC4	General exposures (open systems)	Worker - inhalative, long-term	41,45mg/m ³	0,300
PROC4	General exposures (open systems), Elevated temperature	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC4	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,035
PROC8a	Transfer from/pouring from containers, Manual	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	Equipment cleaning and maintenance	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	Transfer from/pouring from containers, Manual,	Worker - inhalative, long-term	51,81mg/m ³	0,375

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	Elevated temperature			
PROC8a	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC8b	---	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC8b	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC9	Drum and small package filling, Dedicated facility	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC9	Drum and small package filling, Dedicated facility, Elevated temperature	Worker - inhalative, long-term	41,45mg/m ³	0,300
PROC9	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,035
PROC15	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC15	---	Worker - dermal, long-term - systemic	0,07mg/kg bw/day	0,002

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions - which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: <http://www.ecetoc.org/tra>
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Additional good practice advice beyond the REACH Chemical Safety Assessment

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1. Short title of Exposure Scenario 3: Use in dry cleaning

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC6: Calendering operations PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

Amount used	Amounts used in the EU (tonnes/year)	2140 ton(s)/year
	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,01
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treat air emissions. (Efficiency: 99,9 %)
	Air	Activated carbon filter to reduce emissions to air
	Water	Water treatment with air stripping
	Soil	Do not apply industrial sludge to natural soils.
	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Degradation efficiency	92,6 %
	Percentage removed from waste water	92,6 %
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Recovery Methods	Storage of finished products in closed containers.
	Recovery Methods	Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC6, PROC8a, PROC8b



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Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	1 hours/day(PROC8b)
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Material transfers Manual	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC4)
	Finishing operations Treatment by heating	Provide extract ventilation to points where emissions occur.(PROC6)
	Material transfers Drum/batch transfers With Local Exhaust Ventilation	Ensure material transfers are under containment or extract ventilation.(PROC8b)
	Material transfers Drum/batch transfers	Avoid carrying out operation for more than 1 hour.(PROC8b)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.(PROC8a)
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.	

3. Exposure estimation and reference to its source

Environment

ERC4: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,0393µg/L	0,00077
ERC4	---	Marine water	PEC	0,0040µg/L	0,000788
ERC4	---	Fresh water sediment	PEC	0,695µg/kg dry weight (d.w.)	0,000769
ERC4	---	Marine sediment	PEC	0,0712µg/kg dry weight (d.w.)	0,000788
ERC4	---	Agricultural soil	PEC	3,760µg/kg dry weight (d.w.)	0,376
ERC4	---	Sewage treatment plant (STP)	PEC	0,278µg/L	0,000025

Workers

PROC2, PROC4, PROC6, PROC8a, PROC8b: ECETOC TRA model v2

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,5
PROC2	---	Worker - dermal, long-term - systemic	1,4mg/kg/day	0,03
PROC4	---	Worker - inhalative, long-term - systemic	96,7mg/m ³	0,7
PROC4	---	Worker - dermal, long-term - systemic	6,9mg/kg/day	0,17
PROC6	---	Worker - inhalative, long-term - systemic	34,5mg/m ³	0,25
PROC6	---	Worker - dermal, long-term - systemic	0,3mg/kg/day	0,01
PROC8a	---	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,5
PROC8a	---	Worker - dermal, long-term - systemic	13,7mg/kg/day	0,35
PROC8b	With Local Exhaust Ventilation, 8 hours/day	Worker - inhalative, long-term - systemic	10,4mg/m ³	0,08
PROC8b	Without Local Exhaust Ventilation, during 15 mins - 1 hour	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,5
PROC8b	---	Worker - dermal, long-term - systemic	6,9mg/kg/day	0,17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.



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1. Short title of Exposure Scenario 4: Use in dry cleaning

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

Amount used	Amounts used in the EU (tonnes/year)	12408 ton(s)/year
	Fraction of EU tonnage used in region:	0,1
	Fraction used at the main local source.	0,000017
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Assumes use of ECSA III machines, Activated carbon filter to reduce emissions to air, Refrigeration cooling
	Prevent leaks and prevent soil / water pollution caused by leaks.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Degradation efficiency	92,6 %
	Percentage removed from waste water	92,6 %
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Recovery Methods	Storage of finished products in closed containers.
	Recovery Methods	Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 100 %.
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	Mixture/Article	
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	1 hours/day(PROC4, PROC8b)
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Use in contained batch processes Application of cleaning products in closed systems	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC2)
	Material transfers Manual	Avoid carrying out operation for more than 1 hour.(PROC4)
	Material transfers Drum/batch transfers With Local Exhaust Ventilation	Ensure material transfers are under containment or extract ventilation.(PROC8b)
	Material transfers Drum/batch transfers	Avoid carrying out operation for more than 1 hour.(PROC8b)
	Material transfers Drum/batch transfers Closed systems	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC2)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC8a)
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.	
Conditions and measures related to personal protection, hygiene and health evaluation	Equipment cleaning and maintenance	Wear suitable gloves tested to EN374.(PROC8a)

3. Exposure estimation and reference to its source

Environment

ERC8a: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,0142µg/L	0,000279
ERC8a	---	Marine water	PEC	0,0015µg/L	0,000298
ERC8a	---	Fresh water sediment	PEC	0,252µg/kg dry weight (d.w.)	0,000279
ERC8a	---	Marine sediment	PEC	0,0269µg/kg	0,000298

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				dry weight (d.w.)	
ERC8a	---	Agricultural soil	PEC	0,0568µg/kg dry weight (d.w.)	0,00568
ERC8a	---	Sewage treatment plant (STP)	PEC	0,0278µg/L	0,000002

Workers

PROC2, PROC4, PROC8a, PROC8b: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Worker - inhalative, long-term - systemic	96,7mg/m ³	0,7
PROC2	---	Worker - dermal, long-term - systemic	1,4mg/kg/day	0,03
PROC4	---	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,5
PROC4	---	Worker - dermal, long-term - systemic	6,9mg/kg/day	0,17
PROC8a	---	Worker - inhalative, long-term - systemic	96,7mg/m ³	0,7
PROC8a	---	Worker - dermal, long-term - systemic	2,7mg/kg/day	0,07
PROC8b	With Local Exhaust Ventilation, 8 hours/day	Worker - inhalative, long-term - systemic	34,5mg/m ³	0,25
PROC8b	Without Local Exhaust Ventilation, during 15 mins - 1 hour	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,50
PROC8b	---	Worker - dermal, long-term - systemic	6,9mg/kg/day	0,17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.



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1. Short title of Exposure Scenario 5: Use in surface cleaning

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	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 PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC7: Industrial use of substances in closed systems

2.1 Contributing scenario controlling environmental exposure for: ERC7

Amount used	Daily amount per site	13,5 kg/day
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Activated carbon filter to reduce emissions to air
	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Degradation efficiency	92,6 %
	Percentage removed from waste water	92,6 %
Conditions and measures related to external recovery of waste	Recovery Methods	Storage of finished products in closed containers.
	Recovery Methods	Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa



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Frequency and duration of use	Frequency of use	8 hours/day
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Storage	Store substance within a closed system.(PROC1)
	Material transfers Filling of articles/equipment Closed systems	Handle substance within a closed system.(PROC1)
	General exposures Use in contained batch processes Application of cleaning products in closed systems	Provide a good standard of controlled ventilation (5 to 10 air changes per hour) (Efficiency: 70 %)(PROC3)
	Equipment cleaning and maintenance With Local Exhaust Ventilation	Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8a)
	Material transfers Manual	Provide a good standard of controlled ventilation (5 to 10 air changes per hour) (Efficiency: 70 %)(PROC8b)
	Material transfers Manual With Local Exhaust Ventilation	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC8b)
	Material transfers Drum/batch transfers	Use dry break couplings for material transfer. Provide a good standard of controlled ventilation (5 to 10 air changes per hour) (Efficiency: 70 %)(PROC8b)
	Equipment cleaning and maintenance	Wear a respirator conforming to EN140 with Type A filter or better. (Efficiency: 90 %)(PROC8a)
Conditions and measures related to personal protection, hygiene and health evaluation	Equipment cleaning and maintenance	Wear suitable gloves tested to EN374. (Efficiency: 80 %)(PROC8a)
	Equipment cleaning and maintenance With Local Exhaust Ventilation	Wear suitable gloves tested to EN374. (Efficiency: 80 %)(PROC8a)
	Material transfers Manual	Wear suitable gloves tested to EN374. (Efficiency: 80 %)(PROC8b)
	Material transfers Manual With Local Exhaust Ventilation	Wear suitable gloves tested to EN374. (Efficiency: 80 %)(PROC8b)
	Material transfers Drum/batch transfers	Wear suitable gloves tested to EN374. (Efficiency: 80 %)(PROC8b)

3. Exposure estimation and reference to its source

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Environment

ERC7: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC7	---	Fresh water	PEC	0,0171µg/L	0,000319
ERC7	---	Marine water	PEC	0,0018µg/L	0,000319
ERC7	---	Fresh water sediment	PEC	0,3µg/kg dry weight (d.w.)	0,0461
ERC7	---	Marine sediment	PEC	0,0315µg/kg dry weight (d.w.)	0,000335
ERC7	---	Agricultural soil	PEC	0,52µg/kg dry weight (d.w.)	0,000335

Workers

PROC1, PROC3, PROC8a, PROC8b: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - systemic	0,07mg/m³	0,5
PROC1	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	0,03
PROC3	---	Worker - inhalative, long-term - systemic	20,73mg/m³	0,88
PROC3	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,01
PROC8a	---	Worker - inhalative, long-term - systemic	34,54mg/m³	0,5
PROC8a	Equipment cleaning and maintenance	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,03
PROC8a	Equipment cleaning and maintenance, With Local Exhaust Ventilation	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,35
PROC8b	Material transfers, Manual	Worker - inhalative, long-term	58,81mg/m³	0,5
PROC8b	Material transfers, Manual, With Local Exhaust Ventilation	Worker - inhalative, long-term	8,64mg/m³	0,25
PROC8b	Material transfers, Drum/batch transfers	Worker - inhalative, long-term - systemic	51,81mg/m³	0,08
PROC8b	Material transfers, Manual	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,35
PROC8b	Material transfers, Drum/batch transfers	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,17



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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.



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1. Short title of Exposure Scenario 6: Use in heat transfer and hydraulic fluids

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	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 PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
Environmental Release Categories	ERC7: Industrial use of substances in closed systems

2.1 Contributing scenario controlling environmental exposure for: ERC7

Amount used	Amounts used in the EU (tonnes/year)	20 ton(s)/year
	Fraction of EU tonnage used in region:	1
	Fraction used at the main local source.	0,01
Frequency and duration of use	Continuous exposure	20 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 99,9 %)
	Air	Activated carbon filter to reduce emissions to air
	Water	No release to water or STP
	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Recovery Methods	Storage of finished products in closed containers.
	Recovery Methods	Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC8a

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day



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	Frequency of use	1 hours/day(PROC3)
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (closed systems)	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC1)
	Material transfers Use in contained batch processes	Drain down and flush system prior to equipment opening or maintenance.(PROC3)
	Cleaning Closed systems	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC3)
	Material transfers	Avoid carrying out operation for more than 1 hour. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC3)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.(PROC8a)
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.	

3. Exposure estimation and reference to its source

Environment

ERC7: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC7	---	Fresh water	PEC	0,0115µg/L	0,000225
ERC7	---	Marine water	PEC	0,0012µg/L	0,000243
ERC7	---	Fresh water sediment	PEC	0,203µg/kg dry weight (d.w.)	0,000225
ERC7	---	Marine sediment	PEC	0,022µg/kg dry weight (d.w.)	0,000243
ERC7	---	Agricultural soil	PEC	0,0033µg/kg dry weight (d.w.)	0,000330
ERC7	---	Sewage treatment plant (STP)	PEC	0,0000µg/L	0,000000

Workers

PROC1, PROC3, PROC8a: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - systemic	0,1mg/m³	0,00
PROC1	---	Worker - dermal, long-term - systemic	0,3mg/kg/day	0,01
PROC3	Indoor use, Without Local	Worker - inhalative, long-	34,5mg/m³	0,25

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	Exhaust Ventilation, during 15 mins - 1 hour	term - systemic		
PROC3	Outdoor use, 8 hours/day	Worker - inhalative, long-term - systemic	120,9mg/m ³	0,88
PROC3	Outdoor use, during 15 mins - 1 hour	Worker - inhalative, long-term - systemic	24,2mg/m ³	0,18
PROC3	---	Worker - dermal, long-term - systemic	0,3mg/kg/day	0,01
PROC8a	---	Worker - inhalative, long-term - systemic	69,1mg/m ³	0,50
PROC8a	---	Worker - dermal, long-term - systemic	13,7mg/kg/day	0,35

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

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1. Short title of Exposure Scenario 7: Use as a maskant, medium scale

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p>
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

Amount used	Daily amount per site	240 kg/day
Frequency and duration of use	Continuous exposure	250 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,08 %
	Emission or Release Factor: Water	0,003 %
Technical conditions and measures at process level to prevent release	Air	Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 92 %)
	Use vapour recovery units when necessary.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations., Dispose of waste or used sacks/containers according to local



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		regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (closed systems) Storage	Handle substance within a closed system.(PROC1)
	General exposures (closed systems) Continuous process With sample collection	Handle substance within a closed system.(PROC2)
	Film formation - force drying, stoving and other technologies Use in contained systems Elevated temperature	Handle substance within a closed system. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC2)
	General exposures (closed systems) Use in contained batch processes	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system.(PROC3)
	Film formation - air drying Open systems	Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC4)
	Spraying	Carry out in a vented booth or extracted enclosure. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC7)
	Material transfers Non-dedicated facility	Provide extract ventilation to material transfer points and other openings.(PROC8a)
	Material transfers Dedicated facility	Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC8b)
	Roller, spreader, flow application	Provide extract ventilation to points where emissions occur.(PROC10)
	Dipping, immersion and pouring	Provide extract ventilation to points where emissions occur.(PROC13)
	Dipping, immersion and pouring Elevated temperature	Provide extract ventilation to points where emissions occur. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC13)
	Laboratory activities	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC15)
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Conditions and measures related to personal protection, hygiene and health evaluation	General exposures (closed systems) Continuous process With sample collection	Wear suitable gloves tested to EN374.(PROC2)
	Film formation - force drying, stoving and other technologies Use in contained systems Elevated temperature	Wear suitable gloves tested to EN374.(PROC2)
	General exposures (closed systems) Use in contained batch processes	Wear suitable gloves tested to EN374.(PROC3)
	Film formation - air drying Open systems	Wear suitable gloves tested to EN374.(PROC4)
	Spraying	Wear suitable gloves tested to EN374.(PROC7)
	Material transfers Non-dedicated facility	Wear suitable gloves tested to EN374.(PROC8a)
	Equipment cleaning and maintenance	Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.(PROC8a)
	Material transfers Dedicated facility	Wear suitable gloves tested to EN374.(PROC8b)
	Roller, spreader, flow application	Wear suitable gloves tested to EN374.(PROC10)
	Dipping, immersion and pouring	Wear suitable gloves tested to EN374.(PROC13)
	Dipping, immersion and pouring Elevated temperature	Wear suitable gloves tested to EN374.(PROC13)
	Laboratory activities	Wear suitable gloves tested to EN374.(PROC15)

3. Exposure estimation and reference to its source

Environment

ERC4: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,036mg/L	0,71
ERC4	---	Marine water	PEC	0,036mg/L	0,71
ERC4	---	Fresh water sediment	PEC	0,64mg/kg dry weight (d.w.)	0,71
ERC4	---	Marine sediment	PEC	0,64mg/kg dry weight (d.w.)	0,71
ERC4	---	Agricultural soil	PEC	0,01mg/kg dry weight (d.w.)	0,91

ESVOC spERC 4.3a.v1 has been used to evaluate the exposure for the environment.

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Workers

PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - systemic	0,07mg/m ³	0,001
PROC1	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	0,001
PROC2	General exposures (closed systems), Continuous process, With sample collection	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC2	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing. Use in contained systems, Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC2	---	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,007
PROC3	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC3	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,004
PROC4	Film formation - air drying, Open systems	Worker - inhalative, long-term	41,45mg/m ³	0,300
PROC4	Film formation - air drying, Open systems	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,035
PROC7	Spraying	Worker - inhalative, long-term	60,45mg/m ³	0,438
PROC7	Spraying	Worker - dermal, long-term - systemic	8,57mg/kg bw/day	0,218
PROC8a	Material transfers, Non-dedicated facility	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	Equipment cleaning and maintenance	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC8b	---	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC8b	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC10	---	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC10	---	Worker - dermal, long-term	5,49mg/kg bw/day	0,139

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		term - systemic		
PROC13	Dipping, immersion and pouring	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC13	Dipping, immersion and pouring, Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC13	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC15	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC15	---	Worker - dermal, long-term - systemic	0,07mg/kg bw/day	0,002

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.



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1. Short title of Exposure Scenario 8: Use as a maskant, large scale

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p>
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

Amount used	Daily amount per site	800 kg/day
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,02 %
	Emission or Release Factor: Water	0,0009 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 98 %)
	Use vapour recovery units when necessary. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations., Dispose of waste or used sacks/containers according to local regulations.

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2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	0,5 - 10 kPa
Frequency and duration of use	Frequency of use	8 hours/day
Human factors not influenced by risk management	Assumes activities are at ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (closed systems) Storage	Handle substance within a closed system.(PROC1)
	General exposures (closed systems) Continuous process With sample collection	Handle substance within a closed system.(PROC2)
	Film formation - force drying, stoving and other technologies Use in contained systems Elevated temperature	Handle substance within a closed system. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC2)
	General exposures (closed systems) Use in contained batch processes	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system.(PROC3)
	Spraying (automatic/robotic) Elevated temperature	Carry out in a vented booth or extracted enclosure. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC7)
	Material transfers Non-dedicated facility	Provide extract ventilation to material transfer points and other openings.(PROC8a)
	Material transfers Dedicated facility	Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC8b)
	Roller, spreader, flow application	Provide extract ventilation to points where emissions occur.(PROC10)
	Dipping, immersion and pouring	Provide extract ventilation to points where emissions occur.(PROC13)
	Dipping, immersion and pouring Elevated temperature	Provide extract ventilation to points where emissions occur. Provide a good standard of controlled ventilation (5 to 10 air changes per hour)(PROC13)
	Laboratory activities	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC15)
Conditions and measures related to personal protection, hygiene and health evaluation	General exposures (closed systems) Continuous process With sample collection	Wear suitable gloves tested to EN374.(PROC2)



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Film formation - force drying, stoving and other technologies Use in contained systems Elevated temperature	Wear suitable gloves tested to EN374.(PROC2)
General exposures (closed systems) Use in contained batch processes	Wear suitable gloves tested to EN374.(PROC3)
Spraying (automatic/robotic) Elevated temperature	Wear suitable gloves tested to EN374.(PROC7)
Material transfers Non-dedicated facility	Wear suitable gloves tested to EN374.(PROC8a)
Equipment cleaning and maintenance	Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.(PROC8a)
Material transfers Dedicated facility	Wear suitable gloves tested to EN374.(PROC8b)
Roller, spreader, flow application	Wear suitable gloves tested to EN374.(PROC10)
Dipping, immersion and pouring	Wear suitable gloves tested to EN374.(PROC13)
Dipping, immersion and pouring Elevated temperature	Wear suitable gloves tested to EN374.(PROC13)
Laboratory activities	Wear suitable gloves tested to EN374.(PROC15)

3. Exposure estimation and reference to its source

Environment

ERC4: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,036mg/L	0,71
ERC4	---	Marine water	PEC	0,036mg/L	0,71
ERC4	---	Fresh water sediment	PEC	0,64mg/kg dry weight (d.w.)	0,71
ERC4	---	Marine sediment	PEC	0,64mg/kg dry weight (d.w.)	0,71
ERC4	---	Agricultural soil	PEC	0,01mg/kg dry weight (d.w.)	0,91

ESVOC spERC 4.3a.v1 has been used to evaluate the exposure for the environment.

Workers

PROC1, PROC2, PROC3, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15: ECETOC TRA model v2

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - systemic	0,07mg/m ³	0,001
PROC1	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	0,001
PROC2	General exposures (closed systems), Continuous process, With sample collection	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC2	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing, Use in contained systems, Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC2	---	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,007
PROC3	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC3	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,004
PROC7	Spraying (automatic/robotic), Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC7	Spraying (automatic/robotic), Elevated temperature	Worker - dermal, long-term - systemic	8,57mg/kg bw/day	0,218
PROC8a	Material transfers, Non-dedicated facility	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	Equipment cleaning and maintenance	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC8a	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC8b	---	Worker - inhalative, long-term	51,81mg/m ³	0,375
PROC8b	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC10	---	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC10	---	Worker - dermal, long-term - systemic	5,49mg/kg bw/day	0,139
PROC13	Dipping, immersion and pouring	Worker - inhalative, long-term	34,54mg/m ³	0,250
PROC13	Dipping, immersion and pouring, Elevated temperature	Worker - inhalative, long-term	51,81mg/m ³	0,375

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PROC13	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,070
PROC15	---	Worker - inhalative, long-term	48,36mg/m ³	0,350
PROC15	---	Worker - dermal, long-term - systemic	0,07mg/kg bw/day	0,002

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.