

Tetrachloroethylene: CAS: 127-18-4

Section 1		Exposure Scenario: Worker
Title	Manufacture; CAS: 127-18-4	
Sector of Use	SU3	
Process Category	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15	
Product Category	n/a	
Article Category	n/a	
Environmental release Category	ERC1	
Specific environmental release category	-	
Processes, tasks, activities covered	Manufacture or use as process chemical or extraction agent. Includes recycling/ recovery, material transfers, small scale formulation (adding stabilizers), storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Section 2		Operational conditions and risk management measures
Product characteristics		
Physical form of product	Liquid	
Volatility	Medium volatility	
Concentration of substance in product	Up to 100%	
Section 2.1		Control of worker exposure
Operational conditions		
Amounts used	Not relevant for this scenario	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)	
Human factors not influenced by risk management	None identified for this scenario.	
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).	
Risk Management Measures		
Contributing Scenarios	Risk Management Measures	
General exposures, Continuous process (closed systems)	No other specific measures identified	
General exposures. Continuous process. With sample collection (closed systems)	No other specific measures identified	
General exposures. Use in contained batch processes. With sample collection.	Provide extract ventilation to points where emissions occur	
Process sampling	Use a sampling system designed to control exposure	
Mixing operations (open systems). Manual. Small scale.	Ensure operation is undertaken outdoors	
Bulk transfers. Internal (closed	Ensure material transfers are under containment or extract	

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systems)	ventilation
Bulk transfers. Internal	No other specific measures identified
Drum and small package filling. Automated process with (semi) closed systems	Ensure material transfers are under containment or extract ventilation.
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.
Bulk transfers. Transport (closed systems)	Avoid carrying out activities involving exposure for more than 1 hour.
Bulk transfers. Transport (open systems)	Ensure material transfers are under containment or extract ventilation.
Bulk product storage (closed systems). With sample collection.	No other specific measures identified
Laboratory activities	No other specific measures identified

Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Manufacturing
Environmental Release Category	ERC1: Manufacture of substances
Specific ERC	-
Assessment scenario	Onsite monitoring
Operational Conditions	
Amounts used	
Frequency and duration of use	Type of release: continuous; Emission days (days/year): 365
Site specific monitoring data results for surface water effluent	Maximal detection in 2009, 19 µg/L, Limit of detection (LOD =0.001 mg/L=1 ppb)
Location of sample	In waste water treatment plant (WWTP) effluent prior discharge to the river
Environmental factors not influenced by risk management	
Local freshwater dilution factor	287 (calculated)
Local marine water dilution factor	Not applicable
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Closed process
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste gas treatment - thermal oxidation
Treat air emissions to provide a typical removal efficiency of (%)	99.9
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	Not applicable
ERMM2: Typical municipal wastewater treatment technology provides degradation	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%):

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efficiency of (%)	92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ER_{MM,1}) \times (1 - ER_{MM,2}))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Organizational measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. Dispose of waste solvent and used containers according to local regulations. Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to municipal sewage treatment plant	n/a
Conditions and measures related to external treatment of waste for disposal	No land spreading of sludge
Conditions and measures related to external recovery of waste	Dispose of waste solvent and used containers according to local regulations. Dispose of waste or used sacks/containers according to local regulations.
Other environmental control measures additional to above	n/a

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m ³)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm ²)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Continuous process (closed systems)	1	No other specific measures identified	0.1	n.a.	0.3	n.a.	n.a.
General exposures. Continuous process With sample collection (closed systems)	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
General exposures. Use in contained batch processes. With sample collection	3	Provide extract ventilation to points where emissions occur	17.3	n.a.	0.3	n.a.	n.a.
Process sampling	3	Use a sampling system designed to control exposure	34.5	n.a.	0.3	n.a.	n.a.
Mixing operations (open systems).	4	Provide extract Ensure operation is	96.7	n.a.	6.9	n.a.	n.a.

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Manual. Small scale.		undertaken outdoors					
Bulk transfers. Internal (closed systems)	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Drum and small package filling. Automated process with (semi) closed systems	8b	Ensure material transfers are under containment or extract ventilation. Wear suitable gloves tested to EN374	10.4	n.a.	6.9	n.a.	n.a.
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance. Avoid carrying out activities involving exposure for more than 4 hours. Wear suitable gloves tested to EN374	69.1	n.a.	13.7	n.a.	n.a.
Bulk transfers. Transport (closed systems)	8b	Avoid carrying out activities involving exposure for more than 1 hour.	69.1	n.a.	6.9	n.a.	n.a.
Bulk transfers. Transport (open systems)	8b	Ensure material transfers are under containment or extract ventilation.	10.4	n.a.	6.9	n.a.	n.a.
Bulk product storage (closed systems). With sample collection.	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Laboratory activities	15	No other specific measures identified	69.1	n.a.	0.3	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	Not applicable as data was provided in the STP effluent.
Local PEC in surface water during emission episode (dissolved)	mg/L	8.1E-05

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Annual average local PEC in surface water (dissolved)	mg/L	6.9E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.4E-03
Local PEC in sea water during emission episode	mg/L	1.9E-04
Annual average local PEC in sea water (dissolved)	mg/L	1.5E-04
Local PEC in marine sediment during emission episode	mg/kg dwt	3.3E-03
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	8.3E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	8.3E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	8.4E-03
Comments		

Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	3.3E-03
Comments		

Section 1	Exposure Scenario Title
Title	Use as an intermediate
Sector of Use	SU3
Process Category	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC6A

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Specific environmental release category	-
Processes, tasks, activities covered	Use as an intermediate, in catalyst recycling or process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of substance in product	Up to 100%
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)
Risk Management Measures	
Contributing Scenarios	Risk Management Measures
General exposures. Continuous process (closed systems)	No other specific measures identified
General exposures. Continuous process. With sample collection (closed systems)	No other specific measures identified
General exposures. Use in contained batch processes. With sample collection	Provide extract ventilation to points where emissions occur
Process sampling (closed systems)	Use a sampling system designed to control exposure
Bulk transfers. Internal (closed systems)	No other specific measures identified
Bulk transfers. Internal	Ensure material transfers are under containment or extract ventilation.
Drum and small package filling. Automated process with (semi) closed systems	Ensure material transfers are under containment or extract ventilation.
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance
Bulk transfers. Transport (closed systems)	Avoid carrying out activities involving exposure for more than 1 hour.
Bulk transfers. Transport (open systems)	Ensure material transfers are under containment or extract ventilation.
Bulk product storage (closed systems). With sample collection.	No other specific measures identified
Laboratory activities	No other specific measures identified

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Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Use as an intermediate
Environmental Release Category	ERC6a
Specific ERC	
Assessment scenario	
Operational Conditions	
Amounts used	
Frequency and duration of use	Type of release: ND; Emission days (days/year): 300
Site specific monitoring data results for surface water effluent	Not applicable
Location of sample	Not applicable
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Not applicable
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Thermal oxidation
Treat air emissions to provide a typical removal efficiency of (%)	99.9
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	Not applicable
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM, 2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Organizational measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. Prevent discharge of undissolved substance to waste water or recover from wastewater.
Conditions and measures related to municipal sewage treatment plant	Primary and secondary treatments.
Conditions and measures related to external treatment of waste for disposal	Do not apply sewage sludge as fertiliser to agriculture land

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Conditions and measures related to external recovery of waste	Storage of finished products in closed containers (e.g., bulk tanks, drums, cans). Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.
Other environmental control measures additional to above	Vapour recovery units should be used when necessary.

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m ³)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm ²)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Continuous process (closed systems)	1	No other specific measures identified	0.1	n.a.	0.3	n.a.	n.a.
General exposures. Continuous process. With sample collection (closed systems)	2	Provide a good standard of general ventilation (not less than 3-5 air changes per hour) or; Ensure operation is undertaken outdoors	69.1	n.a.	1.4	n.a.	n.a.
General exposures. Use in contained batch processes. With sample collection	3	Provide extract ventilation to points where emissions occur	17.3	n.a.	0.3	n.a.	n.a.
Process sampling. (closed systems)	3	Use a sampling system designed to control exposure	34.5	n.a.	0.3	n.a.	n.a.
Bulk transfers. Internal (closed systems)	2	No other specific measures identified [E120].	69.1	n.a.	1.4	n.a.	n.a.
Bulk transfers. Internal (closed systems)	8b	Ensure material transfers are under containment or extract ventilation	10.4	n.a.	6.9	n.a.	n.a.
Drum and small package filling. Automated process with (semi) closed systems	8b	Ensure material transfers are under containment or extract ventilation	10.4	n.a.	6.9	n.a.	n.a.
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance.	69.1	n.a.	13.7	n.a.	n.a.
Bulk transfers. Transport (closed)	8b	Avoid carrying out activities involving	69.1	n.a.	6.9	n.a.	n.a.

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systems)		exposure for more than 1 hour					
Bulk transfers. Transport (open systems)	8b	Ensure material transfers are under containment or extract ventilation	10.4	n.a.	6.9	n.a.	n.a.
Bulk product storage (closed systems). With sample collection	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Laboratory activities	15	No other specific measures identified	69.1	n.a.	0.3	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	1.5E-01
Local PEC in surface water during emission episode (dissolved)	mg/L	1.5E-02
Annual average local PEC in surface water (dissolved)	mg/L	1.3E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.7E-01
Local PEC in sea water during emission episode	mg/L	1.5E-03
Annual average local PEC in sea water (dissolved)	mg/L	1.3E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	2.7E-02
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	2.967E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	2.970E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	2.997E-03
Comments		

Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	0.00127

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Comments		
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Section 1	Exposure Scenario: Worker	
Title	Industrial use in dry cleaning	
Sector of Use	SU3	
Process Category	PROC2, PROC4, PROC6, PROC8a, PROC8b	
Product Category	n/a	
Article Category	n/a	
Environmental release Category	ERC4	
Specific environmental release category		
Processes, tasks, activities covered	Use of substance in industrial dry cleaning (including wool scouring, textile cleaning and heat finishing). Includes material transfers, storage and maintenance.	
Section 2	Operational conditions and risk management measures	
Product characteristics		
Physical form of product	Liquid	
Volatility	Medium volatility	
Concentration of substance in product	Up to 100%	
Section 2.1	Control of worker exposure	
Operational conditions		
Amounts used	Not relevant for this scenario	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)	
Human factors not influenced by risk management	None identified for this scenario.	
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)	
Risk Management Measures		
Contributing Scenarios	Risk Management Measures	
General exposures. Use in contained systems. Continuous process. Application of cleaning products in closed systems	No other specific measures identified	
General exposures. Use in contained batch processes. Application of cleaning products in closed systems	No other specific measures identified	
Material transfers. Manual	Provide a good standard of general ventilation (not less than 3-5 air changes per hour)	
Finishing operations. Treatment by heating	Provide extract ventilation to points where emissions occur	
Material transfers. Drum/batch	Ensure material transfers are under containment or extract	

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transfers. With local exhaust ventilation	ventilation
Material transfers. Drum/batch transfers	Avoid carrying out activities involving exposure for more than 1 hour
Material transfers. Drum/batch transfers (closed systems)	No other specific measures identified
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.

Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Wool scouring , textile dry cleaning and finishing
Environmental Release Category	ERC4
Specific ERC	
Assessment scenario	Based on reference Document on Best Available Techniques for the textile industry (2003) and data from manufacturer of textile dry-cleaning machine
Operational Conditions	
Amounts used	
Frequency and duration of use	Type of release: continuous; Emission days (days/year): 300
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Solvent evaporation system Solvent Air Stripping Unit Vapour Recovery Unit
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process is closed system
Treat air emissions to provide a typical removal efficiency of (%)	99.99%
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	92.6
Organizational measures to prevent/limit release from site	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 municipal sewage treatment plant	

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ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM,2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Conditions and measures related to external treatment of waste for disposal	Dispose of waste solvent and used containers according to local regulations. Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Storage of finished products in closed containers (e.g., bulk tanks,, drums, cans). Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.
Other environmental control measures additional to above	Vapour recovery units should be used when necessary.

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Use in contained systems. Continuous process. Application of cleaning products in closed systems	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
General exposures. Use in contained batch processes. Application of cleaning products in closed systems	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Material transfers. Manual	4	Provide a good standard of general ventilation (not less than 3-5 air changes per hour)	96.7	n.a.	6.9	n.a.	n.a.
Finishing operations. Treatment by heating	6	Provide extract ventilation to points where emissions occur	34.5	n.a.	0.3	n.a.	n.a.
Material transfers.	8b	Ensure material	10.4	n.a.	6.9	n.a.	n.a.

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Drum/batch transfers. With local exhaust ventilation		transfers are under containment or extract ventilation.					
Material transfers. Drum/batch transfers	8b	Avoid carrying out activities involving exposure for more than 1 hour	69.1	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers (closed systems)	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance.	69.1	n.a.	13.7	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	2.780E-04
Local PEC in surface water during emission episode (dissolved)	mg/L	4.426E-05
Annual average local PEC in surface water (dissolved)	mg/L	3.931E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	7.833E-04
Local PEC in sea water during emission episode	mg/L	4.459E-06
Annual average local PEC in sea water (dissolved)	mg/L	3.964E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	7.892E-05
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	3.76E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	3.72E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	3.34E-03
Comments		

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Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	1.552E-03
Comments		

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Title	Professional use in dry cleaning
Sector of Use	SU22
Process Category	PROC2, PROC4, PROC8a, PROC8b
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC8A, ERC8D
Specific environmental release category	-
Processes, tasks, activities covered	Use of substance in professional dry cleaning, including material transfers and maintenance
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of substance in product	Up to 100%
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)
Risk Management Measures	

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Contributing Scenarios	Risk Management Measures
General exposures. Use in contained batch processes. Application of cleaning products in closed systems.	Provide a good standard of general ventilation (not less than 3-5 air changes per hour).
Material transfers. Manual	Avoid carrying out activities involving exposure for more than 1 hour.
Material transfers. Drum/batch transfers With local exhaust ventilation	Ensure material transfers are under containment or extract ventilation
Material transfers. Drum/batch transfers	Avoid carrying out activities involving exposure for more than 1 hour.
Material transfers. Drum/batch transfers (closed systems)	Provide a good standard of general ventilation (not less than 3-5 air changes per hour)
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance. Provide a good standard of general ventilation (not less than 3-5 air changes per hour). Wear suitable gloves tested to EN374

Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Professional dry cleaning
Environmental Release Category	ERC8A
Specific ERC	-
Assessment scenario	Closed dry cleaning machines
Operational Conditions	
Amounts used	
Frequency and duration of use	Type of release: continuous; Emission days (days/year): 365
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	ECSA Type 3 machine, activated carbon filters, refrigeration cooling
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	

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Organizational measures to prevent/limit release from site	Prevent leaks and the soil/water pollution caused by leaks.
Conditions and measures related to municipal sewage treatment plant	
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM, 2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Conditions and measures related to external treatment of waste for disposal	Dispose of waste solvent and used containers according to local regulations. Dispose of waste or used sacks/containers according to local regulations.
Conditions and measures related to external recovery of waste	Storage of finished products in closed containers (e.g., bulk tanks,, drums, cans). Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.
Other environmental control measures additional to above	

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Use in contained batch processes. Application of cleaning products in closed systems	2	Provide a good standard of general ventilation (not less than 3-5 air changes per hour).	96.7	n.a.	1.4	n.a.	n.a.
Material transfers. Manual	4	Avoid carrying out activities involving exposure for more than 1 hour.	69.1	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers With local exhaust ventilation	8b	Ensure material transfers are under containment or extract ventilation	34.5	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers	8b	Avoid carrying out activities involving exposure for more than 1 hour.	69.1	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers (closed systems)	2	Provide a good standard of general ventilation (not less than 3-5 air changes	96.7	n.a.	1.4	n.a.	n.a.

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		per hour)					
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance. Provide a good standard of general ventilation (not less than 3-5 air changes per hour). Wear suitable gloves tested to EN374	96.7	n.a.	2.7	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	2.780E-05
Local PEC in surface water during emission episode (dissolved)	mg/L	1.924E-05
Annual average local PEC in surface water (dissolved)	mg/L	1.924E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	3.406E-04
Local PEC in sea water during emission episode	mg/L	1.957E-06
Annual average local PEC in sea water (dissolved)	mg/L	1.957E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	3.464E-05
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	5.678E-05
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	5.211E-05
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.460E-05
Comments		

Predicted exposure concentration in the atmospheric compartment

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Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	4.090E-04
Comments		

Section 1	Exposure Scenario: Workers
Title	Industrial use in surface cleaning
Sector of Use	SU3
Process Category	PROC2, PROC3, PROC8a, PROC8b, PROC13
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC4
Specific environmental release category	-
Processes, tasks, activities covered	Use in industrial surface cleaning, including material transfers, storage and maintenance
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of substance in product	Up to 100%
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)
Risk Management Measures	
Contributing Scenarios	Risk Management Measures
General exposures. Use in contained batch processes. Application of cleaning products in closed systems.	No other specific measures identified
General exposures. Use in contained batch processes. Application of cleaning products in closed systems. With local exhaust ventilation	Provide a good standard of general ventilation (not less than 3-5 air changes per hour).
Material transfers. Manual.	Avoid carrying out activities involving exposure for more than 1 hour.
Material transfers. Manual. With local exhaust ventilation	Provide extract ventilation to points where emissions occur.
Material transfers. Drum/batch transfers. With local exhaust ventilation	Ensure material transfers are under containment or extract ventilation.

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Material transfers. Drum/batch transfers	Avoid carrying out activities involving exposure for more than 1 hour.
Material transfers. Drum/batch transfers (closed systems)	No other specific measures identified
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance.

Section 2.2	Control of environmental exposure	
Operational conditions		
Product characteristics	Substance is predominantly hydrophobic. Not biodegradable.	
Contributing scenario	Metal degreasing: closed system	Metal degreasing: semi-open systems
Environmental Release Category	ERC4	ERC4
Specific ERC		
Assessment scenario		
Operational Conditions		
Amounts used		
Frequency and duration of use	Type of release: continuous; Emission days (days/year): 300	Type of release: continuous; Emission days (days/year): 300
Site specific monitoring data results for surface water effluent		
Location of sample		
Environmental factors not influenced by risk management		
Local freshwater dilution factor	10 (default)	10 (default)
Local marine water dilution factor	100 (default)	100 (default)
Other given operational conditions affecting environmental exposure		
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Activated carbon filter for air treatment	Activated carbon filter for air treatment
Treat air emissions to provide a typical removal efficiency of (%)	Not applicable	Not applicable
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)		
Organizational measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in	Site should have a spill plan to ensure that adequate safeguards are in

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	place to minimize the impact of episodic releases.	place to minimize the impact of episodic releases.
Conditions and measures related to municipal sewage treatment plant	Primary and secondary treatments.	Primary and secondary treatments.
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP3: Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)	STP3: Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM,2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Conditions and measures related to external treatment of waste for disposal	Land spreading of sludge acceptable	Land spreading of sludge acceptable
Conditions and measures related to external recovery of waste	Storage of finished products in closed containers (e.g., bulk tanks,, drums, cans). Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.	Storage of finished products in closed containers (e.g., bulk tanks,, drums, cans). Incinerate, absorb, or adsorb vapours stripped from solution whenever necessary.
Other environmental control measures additional to above		

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Use in contained batch processes. Application of cleaning products in closed systems.	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
General exposures. Use in contained batch processes.	3	Provide a good standard of general ventilation (not less	120.9	n.a.	0.3	n.a.	n.a.

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Application of cleaning products in closed systems. With local exhaust ventilation		than 3-5 air changes per hour).					
Material transfers. Manual.	13	Avoid carrying out activities involving exposure for more than 1 hour.	69.1	n.a.	13.7	n.a.	n.a.
Material transfers. Manual. With local exhaust ventilation	13	Provide extract ventilation to points where emissions occur.	34.5	n.a.	13.7	n.a.	n.a.
Material transfers. Drum/batch transfers. With local exhaust ventilation	8b	Ensure material transfers are under containment or extract ventilation.	10.4	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers	8b	Avoid carrying out activities involving exposure for more than 1 hour.	69.1	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers (closed systems)	2	No other specific measures identified	69.1	n.a.	1.4	n.a.	n.a.
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance.	69.1	n.a.	13.7	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit		
PEC for microorganisms in STP	mg/L	3.71E-06	3.71E-06
Local PEC in surface water during emission episode (dissolved)	mg/L	1.68E-05	1.68E-05
Annual average local PEC in surface water (dissolved)	mg/L	1.68E-05	1.68E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.98E-04	2.98E-04
Local PEC in sea water during emission episode	mg/L	1.72E-06	1.72E-06
Annual average local PEC in sea water (dissolved)	mg/L	1.71E-06	1.71E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	3.04E-05	3.04E-05
Comments			

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Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit		
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	4.62E-04	2.01E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	4.62E-04	2.01E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.61E-04	2.02E-03
Comments			

Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit		
Annual average local PEC in air (total)	mg/m ³	5.69E-04	1.12E-03
Comments			

Section 1	Exposure Scenario Worker
Title	Industrial use as heat transfer fluid
Sector of Use	SU3
Process Category	PROC1, PROC3, PROC8a
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC7
Specific environmental release category	
Processes, tasks, activities covered	Industrial use of substance in heat transfer media, including material transfers (no filling) and equipment cleaning and maintenance.
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of	Up to 100%

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substance in product	
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)
Risk Management Measures	
Contributing Scenarios	Risk Management Measures
General exposures (closed systems)	No other specific measures identified
Material transfers. Use in contained batch processes	Provide a good standard of general ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.
Cleaning (closed systems).	Provide a good standard of general ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.
Material transfers.	Provide a good standard of general ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance
Storage (closed systems)	No other specific measures identified

Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Heat transfer fluid
Environmental Release Category	ERC7
Specific ERC	-
Assessment scenario	Based on technical knowledge
Operational Conditions	
Amounts used	
Frequency and duration of use	Type of release: Release only when emptying the system; Emission days (days/year): 20
Site specific monitoring data results for surface water effluent	Not applicable
Location of sample	Not applicable
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)

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Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Vapour Recovery Unit Activated carbon filter
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process is closed system
Treat air emissions to provide a typical removal efficiency of (%)	
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	Not applicable
Organizational measures to prevent/limit release from site	Not applicable
Conditions and measures related to municipal sewage treatment plant	Site should have a spill plan
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	Not applicable
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM, 2))$	Not applicable
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures (closed systems)	1	No other specific measures identified	0.1	n.a.	0.3	n.a.	n.a.
Material transfers. Use in contained batch processes	3	Provide a good standard of general ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.	34.5	n.a.	0.3	n.a.	n.a.
Cleaning (closed systems).	3	Provide a good standard of general	120.9	n.a.	0.3	n.a.	n.a.

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		ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.					
Material transfers.	3	Provide a good standard of general ventilation (not less than 3-5 air changes per hour); or: Ensure operation is undertaken outdoors.	120.9	n.a.	0.3	n.a.	n.a.
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance	69.1	n.a.	13.7	n.a.	n.a.
Storage (closed systems)	1	No other specific measures identified	0.1	n.a.	0.3	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	3.707E-22
Local PEC in surface water during emission episode (dissolved)	mg/L	1.646E-05
Annual average local PEC in surface water (dissolved)	mg/L	1.646E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.914E-04
Local PEC in sea water during emission episode	mg/L	1.679E-06
Annual average local PEC in sea water (dissolved)	mg/L	1.679E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	2.972E-05
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	3.32E-06
Local PEC agricultural soil, averaged over	mg/kg dwt	3.32E-06

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180 days		
Local PEC in grass land, averaged over 180 days	mg/kg dwt	3.32E-06
Comments		

Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	4.0E-04
Comments		

Section 1	Exposure Scenario Worker
Title	Professional use in film cleaning and copying
Sector of Use	SU22
Process Category	PROC2, PROC3, PROC4, PROC8a
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC7
Specific environmental release category	
Processes, tasks, activities covered	Use of substance in professional film cleaning and copying, including material transfers and maintenance.
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of substance in product	Up to 100%
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated)
Human factors not influenced by risk management	None identified for this scenario.

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Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently)
Risk Management Measures	
Contributing Scenarios	Risk Management Measures
General exposures. Use in contained systems. With local exhaust ventilation	Provide a good standard of general ventilation (not less than 3-5 air changes per hour).
Material transfers. Manual	Avoid carrying out activities involving exposure for more than 1 hour.
Material transfers. Drum/batch transfers closed systems)	Provide a good standard of general ventilation (not less than 3-5 air changes per hour).
Equipment cleaning and maintenance	Wear a respirator conforming to EN140 with Type A filter or better.

Section 2.2	Control of environmental exposure
Operational conditions	
Contributing scenario	Film copying
Environmental Release Category	ERC7
Specific ERC	-
Assessment scenario	Based on process data
Operational Conditions	
Amounts used	
Frequency and duration of use	Emission days (days/year): 20
Site specific monitoring data results for surface water effluent	Not applicable
Location of sample	Not applicable
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default/ measured)
Local marine water dilution factor	100 (default/ measured)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Vapour Recovery Unit Activated carbon filter
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process is closed system
Treat air emissions to provide a typical removal efficiency of (%)	
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	Not applicable

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Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM, 2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
General exposures. Use in contained systems. With local exhaust ventilation	2	Provide a good standard of general ventilation (not less than 3-5 air changes per hour). No other specific measures identified	120.9	n.a.	0.3	n.a.	n.a.
Material transfers. Manual	8b	Provide a good standard of general ventilation (not less than 3-5 air changes per hour)	69.1	n.a.	6.9	n.a.	n.a.
Material transfers. Drum/batch transfers closed systems)	8b	Provide a good standard of general ventilation (not less than 3-5	96.7	n.a.	1.4	n.a.	n.a.

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		air changes per hour). Avoid carrying out activities involving exposure for more than 4 hours. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training					
Equipment cleaning and maintenance	1	Provide extract ventilation to points where emissions occur	69.1	n.a.	13.7	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	3.707E-06
Local PEC in surface water during emission episode (dissolved)	mg/L	1.68E-05
Annual average local PEC in surface water (dissolved)	mg/L	1.65E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.98E-04
Local PEC in sea water during emission episode	mg/L	1.72E-06
Annual average local PEC in sea water (dissolved)	mg/L	1.68E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	3.04E-05
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.04E-05
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	9.75E-06
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.75E-06

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Comments		
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Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	4.091E-04
Comments		

Section 1	Exposure Scenario Title
Title	Distribution and (re)packing
Sector of Use	SU3
Process Category	PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15
Product Category	n/a
Article Category	n/a
Environmental release Category	ERC2
Specific environmental release category	
Processes, tasks, activities covered	Distribution and repacking the substance in batch operations, including storage, materials transfers, large and small scale packing, sampling, maintenance and associated laboratory activities.
Section 2	Operational conditions and risk management measures
Product characteristics	
Physical form of product	Liquid
Volatility	Medium volatility
Concentration of substance in product	Up to 100%
Section 2.1	Control of worker exposure
Operational conditions	
Amounts used	Not relevant for this scenario
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [OC1]

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Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).
Risk Management Measures	
Contributing Scenarios	Risk Management Measures
Bulk transfers. Dedicated facility	Avoid carrying out activities involving exposure for more than 1 hour.
Drum/batch transfers. Dedicated facility	Avoid carrying out activities involving exposure for more than 1 hour.
Drum and small package filling. Dedicated facility	Ensure material transfers are under containment or extract ventilation.
Process sampling (closed systems)	Provide a good standard of general ventilation (not less than 3-5 air changes per hour). Ensure operation is undertaken outdoors
Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance
Bulk product storage (closed systems). With sample collection	No other specific measures identified
Laboratory activities	No other specific measures identified

Section 2.2	Control of environmental exposure
Operational conditions	Control of environmental exposure
Contributing scenario	Distribution and (re)packing
Environmental Release Category	ERC2
Specific ERC	ESVOC 3
Assessment scenario	Based on machine specific data
Operational Conditions	
Amounts used	
Frequency and duration of use	Emission days (days/year): 300
Site specific monitoring data results for surface water effluent	Not applicable
Location of sample	Not applicable
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default/ measured)
Local marine water dilution factor	100 (default/ measured)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

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Treat air emissions to provide a typical removal efficiency of (%)	
ERMM1: Typical onsite wastewater treatment technology provides degradation efficiency of (%)	Not applicable
Conditions and measures related to municipal sewage treatment plant	
ERMM2: Typical municipal wastewater treatment technology provides degradation efficiency of (%)	STP: 3 Estimated substance removal from wastewater via domestic sewage treatment (%): 92.6 (default from Simple treat model)
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) $E_{Total,RMM} = 1 - ((1 - ERMM, 1) \times (1 - ERMM,2))$	STP4: Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 92.6
Organizational measures to prevent/limit release from site	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	

Exposure estimation

The worker exposure estimates for the activities associated with this use of tetrachloroethylene have been assessed using ECETOC TRA v2, unless stated differently.

Contributing scenarios	PROC	Risk Management Measures	Inhalatory exposure (mg/m3)		Dermal exposure (mg/kg/day)		Dermal exposure (mg/cm2)
			Long term	Acute	Long term	Acute systemic	Acute local
Bulk transfers. Dedicated facility	8b	Avoid carrying out activities involving exposure for more than 1 hour.	69.08	n.a.	6.86	n.a.	n.a.
Drum/batch transfers. Dedicated facility	8b	Avoid carrying out activities involving exposure for more than 1 hour.	69.08	n.a.	6.86	n.a.	n.a.
Drum and small package filling. Dedicated facility	9	Ensure material transfers are under containment or extract ventilation.	34.54	n.a.	6.86	n.a.	n.a.
Process sampling (closed systems)	3	Provide a good standard of general ventilation (not less than 3-5 air changes per hour). Ensure operation is	120.90	n.a.	0.34	n.a.	n.a.

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		undertaken outdoors					
Equipment cleaning and maintenance	8a	Drain down system prior to equipment break-in or maintenance	69.08	n.a.	13.71	n.a.	n.a.
Bulk product storage (closed systems). With sample collection	2	No other specific measures identified	69.08	n.a.	1.37	n.a.	n.a.
Laboratory activities	15	No other specific measures identified	69.08	n.a.	0.34	n.a.	n.a.

Environmental exposure

Predicted exposure concentrations in aquatic the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	unit	
PEC for microorganisms in STP	mg/L	7.908E-05
Local PEC in surface water during emission episode (dissolved)	mg/L	2.437E-05
Annual average local PEC in surface water (dissolved)	mg/L	2.296E-05
Local PEC in fresh water sediment during emission episode	mg/kg dwt	4.313E-04
Local PEC in sea water during emission episode	mg/L	2.470E-06
Annual average local PEC in sea water (dissolved)	mg/L	2.329E-06
Local PEC in marine sediment during emission episode	mg/kg dwt	4.372E-05
Comments		

Predicted exposure concentration in soils

Local Concentration, Compartment: soil	unit	
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.689E-04
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.556E-04
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.903E-05
Comments		

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Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	unit	
Annual average local PEC in air (total)	mg/m ³	4.140E-04
Comments		