

An illustrative example of the exposure scenarios to be annexed to the safety data sheet

Part 2: Example

June 2017

ABC



EXPOSURE SCENARIOS FOR COMMUNICATION

EDITORIAL NOTE and DISCLAIMER

This set of exposure scenarios (ESs) to be annexed to the safety data sheet (hereafter referred to as an ES for communication) is derived from the "Illustrative Example of a CSR" published on the European Chemical Agency (ECHA) website for a hypothetical substance (the so-called "ECHA substance"). It was originally developed (2014) with input received from industry associations and authorities and is now updated in accordance with new tools and guidelines.

For understanding the scope and the purpose of this document, please also read Part 1: Introductory Note and the description on the webpage (<https://echa.europa.eu/support/practical-examples-of-exposure-scenarios>).

This document includes *Comments bubbles*. These provide additional explanations to the reader but they are not meant to be part of the ES for communication itself.

Two different templates have been used and exemplified in this document: the standard template and an alternative "condensed" template where the common conditions of use for workers contributing scenarios within an exposure scenario have been summarised upfront.

The ECom Standard Phrase Catalogue was used extensively in developing the example; version 3.0 was available at the time of publication.¹ The Catalogue contains standard phrases to use for the content of an exposure scenario for communication. When a suitable phrase could not be identified in the ECom Standard Phrase Catalogue, a new phrase has been used for exemplification purposes. In such cases, the new phrase has been written in *Italic* in this document.

These illustrative ESs for communication (with the exception of the Comments bubbles) have been generated using a Chesar 3.2 file. The format, layout and content of this example reflect the output from this tool. The Chesar 3.2 data file is also published on the ECHA website at the inserted web link above.

¹ <https://echa.europa.eu/csr-es-roadmap/action-area-3>



Disclaimer

This document aims to assist users in complying with their obligations under the REACH Regulation. However, users are reminded that the text of the REACH Regulation is the only authentic legal reference and that the information in this document does not constitute legal advice. Usage of the information remains under the sole responsibility of the user. The European Chemicals Agency does not accept any liability with regard to the use that may be made of the information contained in this document. ECHA does not accept any liability as to the completeness of this illustrative example and its compliance with the obligations imposed under the REACH Regulation.

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Part 2: Example

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ECHA substance

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1. ES 1: Formulation or re-packing; Various products

1.1. Title section

ES name: *Formulation of liquid mixtures*

Environment	
1: Formulation of mixture in closed and open systems	ERC 2
Worker	
2: Receiving and charging of the substance	PROC 8b
3: Mixing or blending in batch processes; Closed systems	PROC 3
4: Mixing or blending in batch processes; Open systems	PROC 5
5: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	PROC 8a
6: Transfer of substance or mixture (charging/discharging) at dedicated facilities	PROC 8b
7: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC 9
8: Equipment cleaning and maintenance	PROC 28

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: *Formulation of mixture in closed and open systems* (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.5 tonnes/day
Annual amount per site <= 100.0 tonnes/year
Technical and organisational conditions and measures
Collect water from equipment/container cleaning as waste
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Conditions and measures related to external treatment of waste (including article waste)
Hazardous waste incineration
Other conditions affecting environmental exposure
Receiving surface water flow >= 18000 m3/day

1.2.2. Control of worker exposure: *Receiving and charging of the substance* (PROC 8b)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Local exhaust ventilation. <i>Inhalation - minimum efficiency of 95.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.

Commented [ECHA1]: Formulation takes place in a range of industrial settings, from environments where good control standards apply to those where controls are limited or non-existent. This exposure scenario assumes that industrial control standards apply.

Commented [ECHA2]: A discussion on how to express the Conditions of Use of Tier I tools plugged-in in Chesar via standard phrases is still ongoing with the ESCOM working group (e.g. how to express dermal protection). The way they are expressed here reflects their implementation in Chesar 3.2.

Commented [ECHA3]: Some conditions of use (e.g. indoor use, basic general ventilation, process temperature) are valid for all workers' contributing scenarios. These "common conditions of use" could be reported in one place. A more compact version of the ES for communication, where common Conditions of Use for workers are reported upfront, can be printed using Chesar 3.2 and is exemplified later.

Commented [ECHA4]: Although this statement does not constrain the use of the substance, it is included because making explicit the upper boundaries for concentration and duration increases clarity for the recipients.

Commented [ECHA5]: Local Exhaust Ventilation (LEV) should be in principle qualified, i.e. the type of LEV described, see for example how ART tool expresses Local Exhaust Ventilation systems, www.advancedreachtool.com. Since ECETOC TRA workers does not qualify the LEV, the effectiveness should be conveyed as minimum.



Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Commented [ECHA6]: Information in the SDS, such as gloves materials, filter types, etc. has the same impact on DU obligations (Art. 37 of REACH Regulation) as if it were contained in the ES.

1.2.3. Control of worker exposure: Mixing or blending in batch processes; Closed systems (PROC 3)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.4. Control of worker exposure: Mixing or blending in batch processes; Open systems (PROC 5)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

**1.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)**

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC 8b)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

1.2.7. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C



1.2.8. Control of worker exposure: Equipment cleaning and maintenance (PROC 28)

Product (Article) characteristics
Covers concentrations up to 100.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Commented [ECHA7]: The updated Guidance R12 has set a new PROC 28 to describe maintenance and cleaning operations. However, the new PROC 28 has no exposure estimation associated to it by ECETOC TRA. Therefore, PROC 8a, which assumes direct contact with the substance, has been used for exposure estimation (see also section paragraph 2.3.8).

Commented [ECHA8]: Respiratory Protection Equipment (RPE) should be in principle qualified, i.e. the type mask, supplied air or not, etc. An example of the type of information expected is reported for a Stoffenmanager based assessment (see paragraph 3.2.4). Since ECETOC TRA workers does not specify the RPE, the effectiveness should be conveyed as minimum.

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: *Formulation of mixture in closed and open systems (ERC 2)*

Release route	Release rate	Release estimation method
Water	0.25 kg/day	Estimated release factor
Air	3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	9.73E-3 mg/L (EUSES 2.1.2)	0.945
Sediment (freshwater)	0.79 mg/kg dw (EUSES 2.1.2)	0.944
Marine water	9.73E-4 mg/L (EUSES 2.1.2)	0.945
Sediment (marine water)	0.079 mg/kg dw (EUSES 2.1.2)	0.944
Sewage Treatment Plant	0.097 mg/L (EUSES 2.1.2)	0.065
Agricultural soil	0.038 mg/kg dw (EUSES 2.1.2)	0.239
Man via environment - Inhalation	4.58E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.039 mg/kg bw/day (EUSES 2.1.2)	0.011
Man via environment - combined routes		0.011

1.3.2. Worker exposure: *Receiving and charging of the substance (PROC 8b)*

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.125 mg/m ³ (TRA Workers 3.0)	0.127
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.518



1.3.3. Worker exposure: Mixing or blending in batch processes; Closed systems (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.75 mg/m ³ (TRA Workers 3.0)	0.152
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers 3.0)	0.02
Combined, systemic, long term		0.172

1.3.4. Worker exposure: Mixing or blending in batch processes; Open systems (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.25 mg/m ³ (TRA Workers 3.0)	0.253
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.645

1.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

1.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.898

1.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.196
Combined, systemic, long term		0.702

1.3.8. Worker exposure: Equipment cleaning and maintenance (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.5 mg/m ³ (TRA based on PROC 8a)	0.304
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA based on PROC 8a)	0.392
Combined, systemic, long term		0.695

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Commented [ECHA9]: Information on scaling is typically included in this section. It must include:

- Scaling method and suggested scaling tool
- Scalable parameters and boundaries of scaling
- Guidance/instruction



2. ES 2: Use at industrial sites; Coatings and Paints, Thinners, paint removers (PC 9a)

2.1. Title section

ES name: *General Industrial use of coatings and inks*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	SPERC	
1: Industrial application of coatings and inks involving water - Large scale	ERC 5	XYZ IULS
2: Industrial application of coatings and inks involving water - Small scale	ERC 5	XYZ IUSS
3: Industrial application of coatings and inks. Water free	ERC 5	XYZ IUWF
Worker	SWED	
4: Raw material receipt and transfer	PROC 8b	
5: Mixing operations; Open systems	PROC 5	
6: Batch loading of equipment (manual, non dedicated)	PROC 8a	
7: Spraying	PROC 7	
8: Printing closed automated machinery	PROC 10	
9: Roller, spreader, flow application; Printing	PROC 10	
10: Dipping, immersion and pouring	PROC 13	
11: Film formation - force drying, stoving and other technologies; Elevated temperature	PROC 2	
12: Equipment cleaning and maintenance; Manual	PROC 28	

Commented [ECHA10]: See comments in corresponding section in ES1

Commented [ECHA11]: For activities in closed systems it is advised to apply the "appropriate" use descriptor characterising the nature of the activity (e.g. printing = PROC 10), rather than using a "surrogate" PROC characterising a closed process in the chemical industry (e.g. PROC 2). However PROC 2 has been used as an input parameter for exposure estimation with the TRA (see also section paragraph 3.3.4).

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Industrial application of coatings and inks involving water - Large scale (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.1 tonnes/day
Annual amount per site <= 30.0 tonnes/year
Technical and organisational conditions and measures
Overspray collected and disposed of as waste
Provide on-site physico-chemical treatment of wastewater – minimum efficiency of 90.0 %
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Indoor use
Receiving surface water flow >= 18000 m3/day

Commented [ECHA12]: See comments in corresponding section in ES1

Commented [ECHA13]: This Contributing Scenario based on the SPERC included in the CSR two different Risk Management Measures, **one** affecting non volatile substances like ECHA Substance (on site wastewater treatment) and **the other** affecting volatile substances only (air thermal treatment). The latter has been manually removed in Chesar from the exposure scenario for communication since it is not relevant for ECHA Substance.

2.2.2. Control of environmental exposure: Industrial application of coatings and inks involving water - Small scale (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.01 tonnes/day
Annual amount per site <= 2.2 tonnes/year



Technical and organisational conditions and measures
<i>Overspray collected and disposed of as waste</i>
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow $\geq 2E3$ m ³ /day
Other conditions affecting environmental exposure
Indoor use
Receiving surface water flow ≥ 18000 m ³ /day

2.2.3. Control of environmental exposure: *Industrial application of coatings and inks. Water free (ERC 5)*

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.1 tonnes/day
Annual amount per site ≤ 30.0 tonnes/year
Technical and organisational conditions and measures
<i>No water used for equipment cleaning</i>
<i>Residues from equipment cleaning disposed of as waste</i>
<i>Overspray collected and disposed of as waste</i>
Other conditions affecting environmental exposure
Indoor use

2.2.4. Control of worker exposure: *Raw material receipt and transfer (PROC 8b)*

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.5. Control of worker exposure: *Mixing operations; Open systems (PROC 5)*

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.



Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.6. Control of worker exposure: *Batch loading of equipment (manual, non dedicated)* (PROC 8a)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

2.2.7. Control of worker exposure: *Spraying* (PROC 7)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Conditions and measures related to personal protection, hygiene and health evaluation
<i>Wear suitable gloves tested to EN374 and sleeves. For further specification, refer to section 8 of the SDS.</i>
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Wear suitable respiratory protection.
Wear suitable coveralls to prevent exposure to the skin. <i>Wear protective shoes.</i>
Use suitable eye protection.

2.2.8. Control of worker exposure: *Printing closed automated machinery* (PROC 10)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures

Commented [ECHA14]: Sleeves are required as the upper wrists are potentially exposed according to ECETOC TRA assumptions.

Commented [ECHA15]: Protective shoes were added here, as coveralls may not include foot cover. It is preferable to express the condition in one single phrase: "Wear suitable coveralls to prevent exposure to the skin, including protective shoes". However two separate phrases are used here as the first is available in the ECom Standard Phrase Catalogue.



Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
<i>Closed application process with occasional exposure</i>
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Commented [ECHA16]: Normally, a more specific description is expected to be provided here on what a closed systems means for this specific activity.

2.2.9. Control of worker exposure: Roller, spreader, flow application; Printing (PROC 10)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Wear suitable gloves tested to EN374.
Use suitable eye protection.

2.2.10. Control of worker exposure: Dipping, immersion and pouring (PROC 13)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
<i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Wear suitable gloves tested to EN374.
Use suitable eye protection.



2.2.11. Control of worker exposure: Film formation - force drying, stoving and other technologies; Elevated temperature (PROC 2)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
<u>Closed drying tunnel with extract ventilation</u>
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 70.0 °C

Commented [ECHA17]: In this case a specific (non) standard phrase has been assigned to express that the drying activity is assumed to be run under closed systems.

2.2.12. Control of worker exposure: Equipment cleaning and maintenance; Manual (PROC 28)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4.0 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Commented [ECHA18]: See comment in corresponding section in ES1 (paragraph 1.2.8)

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Industrial application of coatings and inks involving water - Large scale (ERC 5)

Release route	Release rate	Release estimation method
Water	0.19 kg/day	SPERC
Air	1.5 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	7.4E-3 mg/L (EUSES 2.1.2)	0.718
Sediment (freshwater)	0.601 mg/kg dw (EUSES 2.1.2)	0.718
Marine water	7.4E-4 mg/L (EUSES 2.1.2)	0.718
Sediment (marine water)	0.06 mg/kg dw (EUSES 2.1.2)	0.718



Protection target	Exposure estimate	RCR
Sewage Treatment Plant	0.074 mg/L (EUSES 2.1.2)	0.05
Agricultural soil	0.029 mg/kg dw (EUSES 2.1.2)	0.182
Man via environment - Inhalation	3.43E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.043 mg/kg bw/day (EUSES 2.1.2)	0.012
Man via environment - combined routes		0.012

2.3.2. Environmental release and exposure: *Industrial application of coatings and inks involving water - Small scale (ERC 5)*

Release route	Release rate	Release estimation method
Water	0.19 kg/day	SPERC
Air	0.15 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	7.4E-3 mg/L (EUSES 2.1.2)	0.718
Sediment (freshwater)	0.601 mg/kg dw (EUSES 2.1.2)	0.718
Marine water	7.4E-4 mg/L (EUSES 2.1.2)	0.718
Sediment (marine water)	0.06 mg/kg dw (EUSES 2.1.2)	0.718
Sewage Treatment Plant	0.074 mg/L (EUSES 2.1.2)	0.05
Agricultural soil	0.029 mg/kg dw (EUSES 2.1.2)	0.181
Man via environment - Inhalation	2.64E-5 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.033 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.3. Environmental release and exposure: *Industrial application of coatings and inks. Water free (ERC 5)*

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	1.5 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	1.16E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	9.41E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.08E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	8.75E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	1.4E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	3.43E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	7E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

**2.3.4. Worker exposure: Raw material receipt and transfer (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

2.3.5. Worker exposure: Mixing operations; Open systems (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

2.3.6. Worker exposure: Batch loading of equipment (manual, non dedicated) (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5 mg/m ³ (TRA Workers 3.0)	0.202
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.594

2.3.7. Worker exposure: Spraying (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	1.714 mg/kg bw/day (TRA Workers 3.0)	0.245
Combined, systemic, long term		0.751

2.3.8. Worker exposure: Printing closed automated machinery (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA based on PROC 2)	0.101
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA based on PROC 2)	0.039
Combined, systemic, long term		0.14

2.3.9. Worker exposure: Roller, spreader, flow application; Printing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	5.486 mg/kg bw/day (TRA Workers 3.0)	0.784
Combined, systemic, long term		0.885

2.3.10. Worker exposure: Dipping, immersion and pouring (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

**2.3.11. Worker exposure: Film formation - force drying, stoving and other technologies; Elevated temperature (PROC 2)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.14

2.3.12. Worker exposure: Equipment cleaning and maintenance; Manual (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m ³ (TRA based on PROC 8a)	0.607
Dermal, systemic, long term	0.548 mg/kg bw/day (TRA based on PROC 8a)	0.078
Combined, systemic, long term		0.686

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Commented [ECHA19]: See comment in corresponding section in ES1



3. ES 3: Widespread use by professional workers; Coatings and Paints, Thinners, paint removers (PC 9a)

3.1. Title section

ES name: *Professional painting*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	
1: Use leading to inclusion into/onto matrix	ERC 8f
Worker	
2: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	PROC 8a
3: Roller application or brushing	PROC 10
4: Spraying	PROC 11

Commented [ECHA20]: See comment in corresponding section in ES1

Commented [ECHA21]: Maintenance and cleaning for professional use are already covered in the Chemical safety assessment by the application and transfer activities listed here. Therefore there is no need to report them as separate activities in the ES for communication.

Commented [ECHA22]: See comments in corresponding section in ES1

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use leading to inclusion into/onto matrix (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

Commented [ECHA23]: Specific environmental conditions of use related to Sewage Treatment Plant (STP), such as the application of sludge to agricultural soil, STP effluent rate, etc. are of no relevance to a professional user, who has no control over these conditions. Consequently they are not included in the environmental Contributing Scenario. The only condition of use of relevance is the presence of a Municipal STP, which is therefore included.

3.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 0.25 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

3.2.3. Control of worker exposure: Roller application or brushing (PROC 10)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use



Assumes process temperature up to 40.0 °C
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Use suitable eye protection.

3.2.4. Control of worker exposure: Spraying (PROC 11)

Product (Article) characteristics
Covers concentrations up to 2.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8.0 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
<i>Wear suitable gloves tested to EN374 and sleeves. For further specification, refer to section 8 of the SDS.</i>
<i>Wear half/full face powered air respirator TMP2 or 3 (gas cartridge) - efficiency of at least: 90.0 %</i>
Other conditions affecting workers exposure
Assumes process temperature up to 40.0 °C
Indoor use
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Wear suitable coveralls to prevent exposure to the skin. <i>Wear protective shoes.</i>
Use suitable eye protection.

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Use leading to inclusion into/onto matrix (ERC 8f)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.13E-3 kg/day	ERC
Soil	1.38E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	6.5E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	5.28E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	6.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.22E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	5.35E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.12E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment – Inhalation	7.13E-7 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	4.51E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.25 mg/m ³ (TRA Workers 3.0)	0.253
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.645



3.3.3. Worker exposure: Roller application or brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.4 mg/m ³ (ART)	0.178
Dermal, systemic, long term	1.097 mg/kg bw/day (TRA Workers 3.0)	0.157
Combined, systemic, long term		0.335

3.3.4. Worker exposure: Spraying (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.46 mg/m ³ (Stoffenmanager)	0.383
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.612
Combined, systemic, long term		0.995

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Commented [ECHA24]: See comment in corresponding section in ES1



4. ES 4: Consumer use; Coatings and Paints, Thinners, paint removers (PC 9a)

4.1. Title section

ES name: *Consumer painting*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	
1: Use leading to inclusion into/onto matrix	ERC 8f
Consumer	
2: Waterborne paint; Roller application or brushing	PC 9a
3: Solvent rich paint; Roller application or brushing	PC 9a

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use leading to inclusion into/onto matrix (ERC 8f)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

4.2.2. Control of consumer exposure: Waterborne paint; Roller application or brushing (PC 9a)

Product (article) characteristics
Covers concentrations up to 1.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 events per day
For each use event, covers use amounts up to 3750 g/event
Emission/Application duration ≤ 120.0 min
Other conditions affecting consumers exposure
Covers use in room size of 20.0 m ³
Ventilation rate ≥ 0.6 ach (air changes per hour)
Release area ≤ 15.0 m ²

4.2.3. Control of consumer exposure: Solvent rich paint; Roller application or brushing (PC 9a)

Product (article) characteristics
Covers concentrations up to 1.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 events per day
For each use event, covers use amounts up to 1000 g/event
Emission/Application duration ≤ 120.0 min
Other conditions affecting consumers exposure
Covers use in room size of 20.0 m ³
Ventilation rate ≥ 0.6 ach (air changes per hour)
Release area ≤ 10.0 m ²

Commented [ECHA25]: All environmental conditions of use related to Sewage Treatment Plant (STP) are of no relevance for consumers, who have no control over these conditions. Consequently they are not included in the environmental Contributing Scenario.

Commented [ECHA26]: The conditions of use regarded as relevant for the formulator and to be provided in the ES for communication include:

- Concentration, which sets the upper limit of the substance in the product (paints) the formulator can supply to the consumer market.
- Amount per event and release area, from which the formulator can check whether the area specific amount per application (g/m²) is consistent with the technical instruction he provides to the user.
- Habits and practice such as the duration of the application, room where application takes place, frequency assumed by the assessment.



4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: *Use leading to inclusion into/onto matrix* (ERC 8f)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.13E-3 kg/day	ERC
Soil	1.38E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	6.5E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	5.28E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	6.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.22E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	5.35E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.12E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	7.13E-7 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	4.51E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.2. Consumer exposure: Waterborne paint; Roller application or brushing (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.9 mg/m ³ (ConsExpo)	0.312
Dermal, systemic, long term	0.6 mg/kg bw/day (ConsExpo)	0.171
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, long term		0.484

4.3.3. Consumer exposure: Solvent rich paint; Roller application or brushing (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.35 mg/m ³ (ConsExpo)	0.716
Dermal, systemic, long term	0.6 mg/kg bw/day (ConsExpo)	0.171
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, long term		0.887

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Commented [ECHA27]: This section may include advice to the downstream user on how they can verify that their customer use is covered by the ES.



ECHA substance

EXPOSURE SCENARIO FOR COMMUNICATION

(Alternative compacted template)

Commented [ECHA28]: In the alternative "compacted" template, the "common conditions of use" for workers are reported in one place upfront.

Substance Name: ECHA substance

EC Number:

CAS Number: 11111-11-1

Registration Number:

Date of Generation/Revision: 29/05/2017

Author: ECHA CSR Example



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1. ES 1: Formulation or re-packing; Various products

1.1. Title section

ES name: *Formulation of liquid mixtures*

Environment	
1: Formulation of mixture in closed and open systems	ERC 2
Worker	
2: Receiving and charging of the substance	PROC 8b
3: Mixing or blending in batch processes; Closed systems	PROC 3
4: Mixing or blending in batch processes; Open systems	PROC 5
5: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	PROC 8a
6: Transfer of substance or mixture (charging/discharging) at dedicated facilities	PROC 8b
7: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC 9
8: Equipment cleaning and maintenance	PROC 28

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: *Formulation of mixture in closed and open systems (ERC 2)*

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.5 tonnes/day
Annual amount per site <= 100.0 tonnes/year
Technical and organisational conditions and measures
Collect water from equipment/container cleaning as waste
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Conditions and measures related to external treatment of waste (including article waste)
Hazardous waste incineration
Other conditions affecting environmental exposure
Receiving surface water flow >= 18000 m3/day

1.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed. Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Commented [ECHA29]: This table contains the common conditions of use that apply to all contributing scenarios.

Specific conditions of use per contributing scenario



Contributing scenario	Specific conditions of use
Receiving and charging of the substance (PROC 8b)	Covers concentrations up to 100.0 % Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i> Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Mixing or blending in batch processes; Closed systems (PROC 3)	Covers concentrations up to 100.0 % Covers use up to 8.0 h/day Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition <i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i> Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Mixing or blending in batch processes; Open systems (PROC 5)	Covers concentrations up to 100.0 % Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i> Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)	Covers concentrations up to 2.0 % Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i>
Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC 8b)	Covers concentrations up to 2.0 % Covers use up to 8.0 h/day
Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)	Covers concentrations up to 2.0 % Covers use up to 8.0 h/day
Equipment cleaning and maintenance (PROC 28)	Covers concentrations up to 100.0 % Covers use up to 4.0 h/day Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Wear a respirator providing a minimum efficiency of 90.0 %; For further specification, refer to section 8 of the SDS. Use suitable eye protection.; For further specification, refer to section 8 of the SDS.

Commented [ECHA30]: This table includes the conditions of use specific to certain contributing scenarios but not all.

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: *Formulation of mixture in closed and open systems (ERC 2)*

Release route	Release rate	Release estimation method
Water	0.25 kg/day	Estimated release factor
Air	3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor



Protection target	Exposure estimate	RCR
Fresh water	9.73E-3 mg/L (EUSES 2.1.2)	0.945
Sediment (freshwater)	0.79 mg/kg dw (EUSES 2.1.2)	0.944
Marine water	9.73E-4 mg/L (EUSES 2.1.2)	0.945
Sediment (marine water)	0.079 mg/kg dw (EUSES 2.1.2)	0.944
Sewage Treatment Plant	0.097 mg/L (EUSES 2.1.2)	0.065
Agricultural soil	0.038 mg/kg dw (EUSES 2.1.2)	0.239
Man via environment - Inhalation	4.58E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.039 mg/kg bw/day (EUSES 2.1.2)	0.011
Man via environment - combined routes		0.011

1.3.2. Worker exposure: Receiving and charging of the substance (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.125 mg/m ³ (TRA Workers 3.0)	0.127
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.518

1.3.3. Worker exposure: Mixing or blending in batch processes; Closed systems (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.75 mg/m ³ (TRA Workers 3.0)	0.152
Dermal, systemic, long term	0.138 mg/kg bw/day (TRA Workers 3.0)	0.02
Combined, systemic, long term		0.172

1.3.4. Worker exposure: Mixing or blending in batch processes; Open systems (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.25 mg/m ³ (TRA Workers 3.0)	0.253
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.645

1.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

1.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.898

**1.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	0.196
Combined, systemic, long term		0.702

1.3.8. Worker exposure: Equipment cleaning and maintenance (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7.5 mg/m ³ (TRA based on PROC 8a)	0.304
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA based on PROC 8a)	0.392
Combined, systemic, long term		0.695

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES



2. ES 2: Use at industrial sites; Coatings and Paints, Thinners, paint removers (PC 9a)

2.1. Title section

ES name: *General Industrial use of coatings and inks*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	SPERC	
1: <i>Industrial application of coatings and inks involving water - Large scale</i>	ERC 5	<i>XYZ IULS</i>
2: <i>Industrial application of coatings and inks involving water - Small scale</i>	ERC 5	<i>XYZ IUSS</i>
3: <i>Industrial application of coatings and inks. Water free</i>	ERC 5	<i>XYZ IUWF</i>
Worker	SWED	
4: <i>Raw material receipt and transfer</i>	PROC 8b	
5: <i>Mixing operations; Open systems</i>	PROC 5	
6: <i>Batch loading of equipment (manual, non dedicated)</i>	PROC 8a	
7: <i>Spraying</i>	PROC 7	
8: <i>Printing closed automated machinery</i>	PROC 10	
9: <i>Roller, spreader, flow application; Printing</i>	PROC 10	
10: <i>Dipping, immersion and pouring</i>	PROC 13	
11: <i>Film formation - force drying, stoving and other technologies; Elevated temperature</i>	PROC 2	
12: <i>Equipment cleaning and maintenance; Manual</i>	PROC 28	

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: *Industrial application of coatings and inks involving water - Large scale (ERC 5)*

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.1 tonnes/day
Annual amount per site <= 30.0 tonnes/year
Technical and organisational conditions and measures
<i>Overspray collected and disposed of as waste</i>
<i>Provide on-site physico-chemical treatment of wastewater – minimum efficiency of 90.0 %</i>
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m ³ /day
Other conditions affecting environmental exposure
Indoor use
Receiving surface water flow >= 18000 m ³ /day

2.2.2. Control of environmental exposure: *Industrial application of coatings and inks involving water - Small scale (ERC 5)*

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.01 tonnes/day
Annual amount per site <= 2.2 tonnes/year



Technical and organisational conditions and measures
<i>Overspray collected and disposed of as waste</i>
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow $\geq 2E3$ m ³ /day
Other conditions affecting environmental exposure
Indoor use
Receiving surface water flow ≥ 18000 m ³ /day

2.2.3. Control of environmental exposure: *Industrial application of coatings and inks. Water free (ERC 5)*

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.1 tonnes/day
Annual amount per site ≤ 30.0 tonnes/year
Technical and organisational conditions and measures
<i>No water used for equipment cleaning</i>
<i>Residues from equipment cleaning disposed of as waste</i>
<i>Overspray collected and disposed of as waste</i>
Other conditions affecting environmental exposure
Indoor use

2.2.4. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (Article) characteristics
Covers concentrations up to 2.0 %
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Supervision in place to check that the risk management measures in place are being used correctly and operation conditions followed.; Ensure control measures are regularly inspected and maintained.
Other conditions affecting workers exposure
Indoor use

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
<i>Raw material receipt and transfer (PROC 8b)</i>	Covers use up to 1.0 h/day Assumes process temperature up to 40.0 °C
Mixing operations; Open systems (PROC 5)	Covers use up to 1.0 h/day Assumes process temperature up to 40.0 °C
<i>Batch loading of equipment (manual, non dedicated) (PROC 8a)</i>	Covers use up to 1.0 h/day Assumes process temperature up to 40.0 °C
Spraying (PROC 7)	Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 95.0 %</i> <i>Wear suitable gloves tested to EN374 and sleeves. For further specification, refer to section 8 of the SDS.</i> Assumes process temperature up to 40.0 °C



	<p>Additional good practice advice: Wear suitable respiratory protection. <i>Wear suitable coveralls to prevent exposure to the skin. Wear protective shoes.</i> Use suitable eye protection.</p>
Printing closed automated machinery (PROC 10)	<p>Covers use up to 8.0 h/day <i>Closed application process with occasional exposure</i> Assumes process temperature up to 40.0 °C</p>
Roller, spreader, flow application; Printing (PROC 10)	<p>Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i> Assumes process temperature up to 40.0 °C Additional good practice advice: Wear suitable gloves tested to EN374. Use suitable eye protection.</p>
Dipping, immersion and pouring (PROC 13)	<p>Covers use up to 8.0 h/day <i>Local exhaust ventilation. Inhalation - minimum efficiency of 90.0 %</i> Assumes process temperature up to 40.0 °C Additional good practice advice: Wear suitable gloves tested to EN374. Use suitable eye protection.</p>
Film formation - force drying, stoving and other technologies; Elevated temperature (PROC 2)	<p>Covers use up to 8.0 h/day <i>Closed drying tunnel with extract ventilation</i> Assumes process temperature up to 70.0 °C</p>
Equipment cleaning and maintenance; Manual (PROC 28)	<p>Covers use up to 4.0 h/day Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Assumes process temperature up to 40.0 °C</p>

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: *Industrial application of coatings and inks involving water - Large scale (ERC 5)*

Release route	Release rate	Release estimation method
Water	0.19 kg/day	SPERC
Air	1.5 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	7.4E-3 mg/L (EUSES 2.1.2)	0.718
Sediment (freshwater)	0.601 mg/kg dw (EUSES 2.1.2)	0.718
Marine water	7.4E-4 mg/L (EUSES 2.1.2)	0.718
Sediment (marine water)	0.06 mg/kg dw (EUSES 2.1.2)	0.718
Sewage Treatment Plant	0.074 mg/L (EUSES 2.1.2)	0.05
Agricultural soil	0.029 mg/kg dw (EUSES 2.1.2)	0.182
Man via environment – Inhalation	3.43E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	0.043 mg/kg bw/day (EUSES 2.1.2)	0.012
Man via environment - combined routes		0.012



2.3.2. Environmental release and exposure: *Industrial application of coatings and inks involving water - Small scale (ERC 5)*

Release route	Release rate	Release estimation method
Water	0.19 kg/day	SPERC
Air	0.15 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	7.4E-3 mg/L (EUSES 2.1.2)	0.718
Sediment (freshwater)	0.601 mg/kg dw (EUSES 2.1.2)	0.718
Marine water	7.4E-4 mg/L (EUSES 2.1.2)	0.718
Sediment (marine water)	0.06 mg/kg dw (EUSES 2.1.2)	0.718
Sewage Treatment Plant	0.074 mg/L (EUSES 2.1.2)	0.05
Agricultural soil	0.029 mg/kg dw (EUSES 2.1.2)	0.181
Man via environment - Inhalation	2.64E-5 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	0.033 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.3. Environmental release and exposure: *Industrial application of coatings and inks. Water free (ERC 5)*

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	1.5 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	1.16E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	9.41E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.08E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	8.75E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	1.4E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	3.43E-4 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	7E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.4. Worker exposure: *Raw material receipt and transfer (PROC 8b)*

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

2.3.5. Worker exposure: *Mixing operations; Open systems (PROC 5)*

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101



Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

2.3.6. Worker exposure: *Batch loading of equipment (manual, non dedicated)* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5 mg/m ³ (TRA Workers 3.0)	0.202
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.594

2.3.7. Worker exposure: *Spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	12.5 mg/m ³ (TRA Workers 3.0)	0.506
Dermal, systemic, long term	1.714 mg/kg bw/day (TRA Workers 3.0)	0.245
Combined, systemic, long term		0.751

2.3.8. Worker exposure: *Printing closed automated machinery* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA based on PROC 2)	0.101
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA based on PROC 2)	0.039
Combined, systemic, long term		0.14

2.3.9. Worker exposure: *Roller, spreader, flow application; Printing* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	5.486 mg/kg bw/day (TRA Workers 3.0)	0.784
Combined, systemic, long term		0.885

2.3.10. Worker exposure: *Dipping, immersion and pouring* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.493

2.3.11. Worker exposure: *Film formation - force drying, stoving and other technologies; Elevated temperature* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.5 mg/m ³ (TRA Workers 3.0)	0.101
Dermal, systemic, long term	0.274 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.14

2.3.12. Worker exposure: *Equipment cleaning and maintenance; Manual* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	15 mg/m ³ (TRA based on PROC 8a)	0.607



Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.548 mg/kg bw/day (TRA based on PROC 8a)	0.078
Combined, systemic, long term		0.686

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES



3. ES 3: Widespread use by professional workers; Coatings and Paints, Thinners, paint removers (PC 9a)

3.1. Title section

ES name: *Professional painting*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	
1: Use leading to inclusion into/onto matrix	ERC 8f
Worker	
2: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	PROC 8a
3: Roller application or brushing	PROC 10
4: Spraying	PROC 11

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use leading to inclusion into/onto matrix (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

3.2.2. Control of worker exposure

Conditions of use applicable to all contributing scenarios

Product (Article) characteristics
Covers concentrations up to 2.0 %
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40.0 °C

Specific conditions of use per contributing scenario

Contributing scenario	Specific conditions of use
Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)	Covers use up to 0.25 h/day Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Roller application or brushing (PROC 10)	Covers use up to 8.0 h/day Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS. Additional good practice advice: Use suitable eye protection.
Spraying (PROC 11)	Covers use up to 8.0 h/day Wear suitable gloves tested to EN374 and sleeves. For further specification, refer to section 8 of the SDS. Wear half/full face powered air respirator TMP2 or 3 (gas cartridge) -



	<i>efficiency of at least: 90.0 %</i> Additional good practice advice: <i>Wear suitable coveralls to prevent exposure to the skin. Wear protective shoes.</i> Use suitable eye protection.
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3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: *Use leading to inclusion into/onto matrix (ERC 8f)*

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.13E-3 kg/day	ERC
Soil	1.38E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	6.5E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	5.28E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	6.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.22E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	5.35E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.12E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	7.13E-7 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	4.51E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.25 mg/m ³ (TRA Workers 3.0)	0.253
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	0.392
Combined, systemic, long term		0.645

3.3.3. Worker exposure: Roller application or brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.4 mg/m ³ (ART)	0.178
Dermal, systemic, long term	1.097 mg/kg bw/day (TRA Workers 3.0)	0.157
Combined, systemic, long term		0.335

3.3.4. Worker exposure: Spraying (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.46 mg/m ³ (Stoffenmanager)	0.383
Dermal, systemic, long term	4.286 mg/kg bw/day (TRA Workers 3.0)	0.612
Combined, systemic, long term		0.995

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES



4. ES 4: Consumer use; Coatings and Paints, Thinners, paint removers (PC 9a)

4.1. Title section

ES name: *Consumer painting*

Product category: Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	
1: <i>Use leading to inclusion into/onto matrix</i>	ERC 8f
Consumer	
2: Waterborne paint; Roller application or brushing	PC 9a
3: Solvent rich paint; Roller application or brushing	PC 9a

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: *Use leading to inclusion into/onto matrix* (ERC 8f)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

4.2.2. Control of consumer exposure: Waterborne paint; Roller application or brushing (PC 9a)

Product (article) characteristics
Covers concentrations up to 1.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 events per day
For each use event, covers use amounts up to 3750 g/event
<i>Emission/Application duration <= 120.0 min</i>
Other conditions affecting consumers exposure
Covers use in room size of 20.0 m ³
<i>Ventilation rate >= 0.6 ach (air changes per hour)</i>
Release area <= 15.0 m ²

4.2.3. Control of consumer exposure: Solvent rich paint; Roller application or brushing (PC 9a)

Product (article) characteristics
Covers concentrations up to 1.0 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1.0 events per day
For each use event, covers use amounts up to 1000 g/event
<i>Emission/Application duration <= 120.0 min</i>
Other conditions affecting consumers exposure
Covers use in room size of 20.0 m ³
<i>Ventilation rate >= 0.6 ach (air changes per hour)</i>
Release area <= 10.0 m ²



4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: *Use leading to inclusion into/onto matrix (ERC 8f)*

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.13E-3 kg/day	ERC
Soil	1.38E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	6.5E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	5.28E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	6.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.22E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	5.35E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.12E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	7.13E-7 mg/m ³ (EUSES 2.1.2)	< 0.01
Man via environment – Oral	4.51E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.2. Consumer exposure: Waterborne paint; Roller application or brushing (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.9 mg/m ³ (ConsExpo)	0.312
Dermal, systemic, long term	0.6 mg/kg bw/day (ConsExpo)	0.171
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, long term		0.484

4.3.3. Consumer exposure: Solvent rich paint; Roller application or brushing (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.35 mg/m ³ (ConsExpo)	0.716
Dermal, systemic, long term	0.6 mg/kg bw/day (ConsExpo)	0.171
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, long term		0.887

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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