

18. ES 18: Use at industrial sites; Passivation processes in surface treatment at large industrial sites with continuous processes

18.1. Title section

Product category: Metal surface treatment products (PC 14)

Sector of use: Manufacture of fabricated metal products, except machinery and equipment (SU 15)

Environment	
1: Passivation processes in surface treatment at large industrial sites with continuous processes ES1 STP Discharge	ERC 5
2: Passivation processes in surface treatment at large industrial sites with continuous processes ES2 Direct Discharge	ERC 5
3: Passivation processes in surface treatment at large industrial sites with continuous processes ES3 Marine Discharge	ERC 5
Worker	
4: Raw material handling (exclusively aqueous solutions as input materials)	PROC 21, PROC 9
5: Passivation	PROC 2, PROC 13
6: Packaging and handling of passivated articles	PROC 21
Subsequent service life exposure scenario(s)	
ES 21: Service life (worker at industrial site); Various articles; Industrial handling of surface treated articles (passivated/plated/sprayed)	
ES 22: Service life (professional worker); Various articles; Professional handling of surface treated articles (passivated/plated/sprayed)	

18.2. Conditions of use affecting exposure

18.2.1. Control of environmental exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES1 STP Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.025 tonnes/day
Annual amount per site <= 4 tonnes/year
Emission days >= 160 days/year
Technical and organisational conditions and measures
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
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)
Dispose of waste product or used containers according to local regulations.

Other conditions affecting environmental exposure
No discharge to marine water assumed
Local freshwater dilution factor 200

18.2.2. Control of environmental exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES2 Direct Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.025 tonnes/day
Annual amount per site ≤ 4 tonnes/year
Emission days ≥ 160 days/year
Technical and organisational conditions and measures
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day
Local freshwater dilution factor 300

18.2.3. Control of environmental exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES3 Marine Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.025 tonnes/day
Annual amount per site ≤ 4 tonnes/year
Emission days ≥ 160 days/year
Technical and organisational conditions and measures
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day
No discharge to freshwater assumed
Local marine water dilution factor 100

18.2.4. Control of worker exposure: Raw material handling (exclusively aqueous solutions as input materials) (PROC 21, PROC 9)

Product (article) characteristics
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Physical form covered in this ES: Aqueous solution.
Maximum emission potential covered in this ES: Very low.
Limit the concentration of the substance in mixture to ≤ 25 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process has to be fully automated.
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.
Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

18.2.5. Control of worker exposure: Passivation (PROC 2, PROC 13)

Product (article) characteristics
Physical form covered in this ES: Aqueous solution.
Maximum emission potential covered in this ES: Very low.
Limit the concentration of the substance in mixture to ≤ 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Ensure full containment of the process.
Process has to be fully automated.
Use of an integrated local exhaust ventilation with an efficiency of at least 90% is required.
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.
Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

18.2.6. Control of worker exposure: Packaging and handling of passivated articles (PROC 21)

Product (article) characteristics
Physical form covered in this ES: Massive object.
Maximum emission potential covered in this ES: Very low.
Concentration of the substance in mixture is not restricted.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process has to be fully automated.
Process is carried out at ambient temperature.
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.

Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

18.3. Exposure estimation and reference to its source

18.3.1. Environmental release and exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES1 STP Discharge (ERC 5)

Release route	Release rate	Release estimation method
Water	0.125 kg/day	Estimated release factor
Air	0.05 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.18E-4 mg/L (EUSES 2.1.2)	0.352
Sediment (freshwater)	8.81 mg/kg dw (PEC sediment calculation method for metals)	0.164
Sewage Treatment Plant	0.037 mg/L (EUSES 2.1.2)	0.101
Agricultural soil	1.292 mg/kg dw (EUSES 2.1.2)	0.119
Man via environment - Inhalation	6.09E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

18.3.2. Environmental release and exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES2 Direct Discharge (ERC 5)

Release route	Release rate	Release estimation method
Water	0.125 kg/day	Estimated release factor
Air	0.05 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.32E-4 mg/L (EUSES 2.1.2)	0.373
Sediment (freshwater)	9.32 mg/kg dw (PEC sediment calculation method for metals)	0.173
Agricultural soil	0.239 mg/kg dw (EUSES 2.1.2)	0.022
Man via environment - Inhalation	6.09E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

18.3.3. Environmental release and exposure: Passivation processes in surface treatment at large industrial sites with continuous processes ES3 Marine Discharge (ERC 5)

Release route	Release rate	Release estimation method
Water	0.125 kg/day	Estimated release factor
Air	0.05 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	0.286 µg/L (Clocal calculation with Kp susp. matter marine)	0.121
Sediment (marine water)	38.02 mg/kg dw (PEC sediment calculation method for metals)	0.545
Agricultural soil	0.239 mg/kg dw (EUSES 2.1.2)	0.022
Man via environment - Inhalation	6.09E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

18.3.4. Worker exposure: Raw material handling (exclusively aqueous solutions as input materials) (PROC 21, PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	8.6 µg/m ³ (Measured data)	0.215

18.3.5. Worker exposure: Passivation (PROC 2, PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	1 µg/m ³ (MEASE)	0.025

18.3.6. Worker exposure: Packaging and handling of passivated articles (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	8.6 µg/m ³ (Measured data)	0.215

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

Guidance: Please refer to Section 0.3 of this "ES for Communication".