

17. ES 17: Use at industrial sites; Industrial use of cobalt in passivation processes in surface treatment

17.1. Title section

Product category: Metal surface treatment products (PC 14)

Environment	
1: Industrial use of cobalt in passivation processes in surface treatment ES1 STP Discharge	ERC 5
2: Industrial use of cobalt in passivation processes in surface treatment ES2 Direct Discharge	ERC 5
3: Industrial use of cobalt in passivation processes in surface treatment ES3 Marine Discharge	ERC 5
Worker	
4: Raw material handling	PROC 21
5: Wet processes	PROC 2, PROC 1
6: Passivation	PROC 13
7: Packaging and handling of passivated articles	PROC 21
8: Cleaning & Maintenance	PROC 28
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)	
ES 23: Service life (consumers); Various articles; heat and wear resistant vehicle parts	

17.2. Conditions of use affecting exposure

17.2.1. Control of environmental exposure: Industrial use of cobalt in passivation processes in surface treatment 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

17.2.2. Control of environmental exposure: Industrial use of cobalt in passivation processes in surface treatment 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

17.2.3. Control of environmental exposure: Industrial use of cobalt in passivation processes in surface treatment 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

17.2.4. Control of worker exposure: Raw material handling (PROC 21)

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

17.2.5. Control of worker exposure: Wet processes (PROC 2, PROC 1)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Aqueous solution.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient temperature.
Ensure full containment of the process.
Level of automation should be semi-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
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
APF of RPE = 10 (90% respiratory protection).

17.2.6. Control of worker exposure: Passivation (PROC 13)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Limit the concentration of the substance in mixture to <= 5 %.
Physical form covered in this ES: Aqueous solution.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
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.

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

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

17.2.8. Control of worker exposure: Cleaning & Maintenance (PROC 28)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Dried splashes/overspill.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient pressure.
Process is carried out at ambient temperature.
Maintenance and repair work only at facilities which are not in operation. Minor cleaning tasks may be conducted under operation.
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.
APF of RPE = 10 (90% respiratory protection).

17.3. Exposure estimation and reference to its source

17.3.1. Environmental release and exposure: Industrial use of cobalt in passivation processes in surface treatment 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
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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

17.3.2. Environmental release and exposure: Industrial use of cobalt in passivation processes in surface treatment 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

17.3.3. Environmental release and exposure: Industrial use of cobalt in passivation processes in surface treatment 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

17.3.4. Worker exposure: Raw material handling (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

17.3.5. Worker exposure: Wet processes (PROC 2, PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
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Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	2.9 µg/m ³ (Measured data)	0.072

17.3.6. Worker exposure: Passivation (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	2 µg/m ³ (MEASE)	0.05

17.3.7. 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

17.3.8. Worker exposure: Cleaning & Maintenance (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	16.8 µg/m ³ (Measured data)	0.42

17.4. 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".