

17. ES 17: Formulation or re-packing; Use of nickel metal in formulating and repackaging of surface treatment products

17.1. Title section

Product category: Metal surface treatment products (PC 14)

Environment	
1: Use of nickel metal in formulating and repackaging of surface treatment products - Discharge to fresh water via municipal sewage treatment plant	ERC 2
2: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to fresh water	ERC 2
3: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to marine water	ERC 2
Worker	
4: Powder handling	PROC 26
5: Screening	PROC 3, PROC 2, PROC 1
6: Packaging of resin formulations	PROC 8b, PROC 9
7: Laboratory testing	PROC 15
8: Cleaning/removal of dust	PROC 28

17.2. Conditions of use affecting exposure

17.2.1. Control of environmental exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Discharge to fresh water via municipal sewage treatment plant (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site \leq 0.186 tonnes/day (All the amounts and concentrations are expressed as Ni as this is the driver for the environmental risk assessment.)
Annual amount per site \leq 41 tonnes/year
Emission days \geq 220 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 \geq 2E3 m ³ /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
Receiving surface water flow \geq 1.8E4 m ³ /day

No discharge to marine water assumed
Receiving water dilution (fresh or marine) ≥ 10

17.2.2. Control of environmental exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to fresh water (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.096 tonnes/day (All the amounts and concentrations are expressed as Ni as this is the driver for the environmental risk assessment.)
Annual amount per site ≤ 21 tonnes/year
Emission days ≥ 220 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
Receiving surface water flow $\geq 4.98E3$ m ³ /day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) ≥ 200
Assumed effluent discharge flow from site ≥ 25 m ³ /day

17.2.3. Control of environmental exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to marine water (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.096 tonnes/day (All the amounts and concentrations are expressed as Ni as this is the driver for the environmental risk assessment.)
Annual amount per site ≤ 21 tonnes/year
Emission days ≥ 220 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
No discharge to freshwater assumed
Receiving water dilution (fresh or marine) ≥ 100
Assumed effluent discharge flow from site ≥ 25 m ³ /day

17.2.4. Control of worker exposure: Powder handling (PROC 26)

Product (article) characteristics
Physical form of product; Solid, high dustiness
Amount used (or contained in articles), frequency and duration of use/exposure
Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Local exhaust ventilation
Semi-closed system
Conditions and measures related to personal protection, hygiene and health evaluation
APF of RPE = 10 (90% respiratory 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.

17.2.5. Control of worker exposure: Screening (PROC 3, PROC 2, PROC 1)

Product (article) characteristics
Physical form of product; Solid, high dustiness
Amount used (or contained in articles), frequency and duration of use/exposure
Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Closed process with occasional opening
Ensure automation of the process as far as technically feasible.
Use of an integrated local exhaust ventilation is required.

17.2.6. Control of worker exposure: Packaging of resin formulations (PROC 8b, PROC 9)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Physical form of product: Resins.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Covers use at ambient temperatures.

17.2.7. Control of worker exposure: Laboratory testing (PROC 15)

Product (article) characteristics
Physical form of product: Resins.
Amount used (or contained in articles), frequency and duration of use/exposure
Amount per use < 1 kg
Technical and organisational conditions and measures
Use of an extraction hood is required.

17.2.8. Control of worker exposure: Cleaning/removal of dust (PROC 28)

Product (article) characteristics
Physical form of product: Residual dust.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Cleaning is conducted using cleaning machines, in particular hovering is applied and the use of compressed air is omitted.
Conditions and measures related to personal protection, hygiene and health evaluation
APF of RPE = 20 (95% respiratory protection). For further specification, refer to section 8 of the SDS.

17.3. Exposure estimation and reference to its source

17.3.1. Environmental release and exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Discharge to fresh water via municipal sewage treatment plant (ERC 2)

Release route	Release rate	Release estimation method
Water	0.022 kg/day	Estimated release factor
Air	9.32E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.37E-3 mg/L (EUSES 2.1.2)	0.474
Sediment (freshwater)	45.7 mg/kg dw (PEC sediment calculation method for metals)	0.419
Sewage Treatment Plant	6.49E-3 mg/L (EUSES 2.1.2)	0.02
Agricultural soil	16.38 mg/kg dw (EUSES 2.1.2)	0.548

17.3.2. Environmental release and exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to fresh water (ERC 2)

Release route	Release rate	Release estimation method
Water	0.011 kg/day	Estimated release factor
Air	4.77E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	4.49E-3 mg/L (EUSES 2.1.2)	0.632
Sediment (freshwater)	75.3 mg/kg dw (PEC sediment calculation method for metals)	0.691
Agricultural soil	16.2 mg/kg dw (EUSES 2.1.2)	0.542

17.3.3. Environmental release and exposure: Use of nickel metal in formulating and repackaging of surface treatment products - Direct discharge to marine water (ERC 2)

Release route	Release rate	Release estimation method
Water	0.011 kg/day	Estimated release factor
Air	4.77E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	3.48E-3 mg/L (EUSES 2.1.2)	0.404
Sediment (marine water)	99.7 mg/kg dw (PEC sediment calculation method for metals)	0.915
Agricultural soil	16.2 mg/kg dw (EUSES 2.1.2)	0.542

17.3.4. Worker exposure: Powder handling (PROC 26)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.014 mg/m ³ (Measured data)	0.28
Inhalation, local, long term	0.014 mg/m ³ (Measured data)	0.28
Inhalation, local, acute	0.071 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	5.18 µg/cm ² (Measured data)	0.148
Combined, systemic, long term		0.28

17.3.5. Worker exposure: Screening (PROC 3, PROC 2, PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.02 mg/m ³ (Measured data)	0.4
Inhalation, local, long term	0.02 mg/m ³ (Measured data)	0.4
Inhalation, local, acute	0.06 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.4

17.3.6. Worker exposure: Packaging of resin formulations (PROC 8b, PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, acute	0.047 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.24

17.3.7. Worker exposure: Laboratory testing (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3E-3 mg/m ³ (Measured data)	0.06
Inhalation, local, long term	3E-3 mg/m ³ (Measured data)	0.06
Inhalation, local, acute	0.01 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.06

17.3.8. Worker exposure: Cleaning/removal of dust (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.032 mg/m ³ (Measured data)	0.64
Inhalation, local, long term	0.032 mg/m ³ (Measured data)	0.64
Inhalation, local, acute	0.189 mg/m ³ (Measured data)	0.016
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.64

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".