

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 ≤ 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 ≤ 41 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 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 |

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| 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)

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|---|
| 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)

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|---|
| 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)

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|---|
| 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)

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|---|
| 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)

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|---|
| 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)

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| 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 |
|---------------------------------------|-------------------|-----|
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| 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".