

## 29. ES 29: Use at industrial sites; Use of nickel metal in the production of nickel-containing electronics

### 29.1. Title section

Product category: Metal surface treatment products (PC 14)

Sector of use: Manufacture of computer, electronic and optical products, electrical equipment (SU 16)

Environment	
1: Use of nickel metal in the production of nickel-containing electronics - Discharge to fresh water via municipal sewage treatment plant	ERC 5
2: Use of nickel metal in the production of nickel-containing electronics - Direct discharge to marine water	ERC 5
Worker	
3: Powder handling and paste mixing	PROC 26
4: Paste printing and firing	PROC 3
5: Wet cleaning	PROC 28
6: Cleaning/removal of dust	PROC 28

### 29.2. Conditions of use affecting exposure

#### 29.2.1. Control of environmental exposure: Use of nickel metal in the production of nickel-containing electronics - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site $\leq 0.058$ 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 $\leq 14$ tonnes/year
Emission days $\geq 240$ 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 <sup>3</sup> /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 <sup>3</sup> /day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) $\geq 10$

### 29.2.2. Control of environmental exposure: Use of nickel metal in the production of nickel-containing electronics - Direct discharge to marine water (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq 0.058$ 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 $\leq 14$ tonnes/year
Emission days $\geq 240$ days/year
<b>Technical and organisational conditions and measures</b>
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
<b>Conditions and measures related to external treatment of waste (including article waste)</b>
Dispose of waste product or used containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
No discharge to freshwater assumed
Receiving water dilution (fresh or marine) $\geq 1E3$
Assumed effluent discharge flow from site $\geq 200$ m <sup>3</sup> /day

### 29.2.3. Control of worker exposure: Powder handling and paste mixing (PROC 26)

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

### 29.2.4. Control of worker exposure: Paste printing and firing (PROC 3)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Low.
Physical form of product: Damp solid.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Use in closed process
Ensure automation of the process as far as technically feasible.

Use of an integrated local exhaust ventilation is required.

### 29.2.5. Control of worker exposure: Wet cleaning (PROC 28)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.
Physical form of product: Solution and other liquid materials, e.g. suspensions are also covered.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Cleaning machines such as power sweeper, no direct manual cleaning.
Covers use at ambient temperatures.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
APF of RPE = 10 (90% respiratory protection).

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

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

## 29.3. Exposure estimation and reference to its source

### 29.3.1. Environmental release and exposure: Use of nickel metal in the production of nickel-containing electronics - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

Release route	Release rate	Release estimation method
Water	0.025 kg/day	Estimated release factor
Air	0.292 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.44E-3 mg/L (EUSES 2.1.2)	0.484
Sediment (freshwater)	47.7 mg/kg dw (PEC sediment calculation method for metals)	0.438
Sewage Treatment Plant	7.53E-3 mg/L (EUSES 2.1.2)	0.023
Agricultural soil	16.43 mg/kg dw (EUSES 2.1.2)	0.55

### 29.3.2. Environmental release and exposure: Use of nickel metal in the production of nickel-containing electronics - Direct discharge to marine water (ERC 5)

Release route	Release rate	Release estimation method
Water	0.025 kg/day	Estimated release factor
Air	0.292 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	1.2E-3 mg/L (EUSES 2.1.2)	0.139
Sediment (marine water)	39.8 mg/kg dw (PEC sediment calculation method for metals)	0.365
Agricultural soil	16.22 mg/kg dw (EUSES 2.1.2)	0.543

### 29.3.3. Worker exposure: Powder handling and paste mixing (PROC 26)

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

### 29.3.4. Worker exposure: Paste printing and firing (PROC 3)

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

### 29.3.5. Worker exposure: Wet cleaning (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m <sup>3</sup> (Measured data)	0.12
Inhalation, local, long term	6E-3 mg/m <sup>3</sup> (Measured data)	0.12
Inhalation, local, acute	0.026 mg/m <sup>3</sup> (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm <sup>2</sup> (Measured data)	0.022
Combined, systemic, long term		0.12

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

Route of exposure and type of effects	Exposure estimate	RCR

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

## **29.4. 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”.