

## 32. ES 32: Use at industrial sites; Use of nickel metal for the manufacture of nickel salts

### 32.1. Title section

Sector of use: Manufacture of fine chemicals (SU 9)

<b>Environment</b>	
1: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to fresh water	ERC 6a
2: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to marine water	ERC 6a
<b>Worker</b>	
3: Handling of powders	PROC 26
4: Handling of massive material	PROC 21
5: Wet chemical reaction	PROC 4, PROC 2, PROC 3, PROC 1
6: Control room operations	PROC 2
7: Wet cleaning	PROC 28
8: Cleaning/removal of dust	PROC 28

### 32.2. Conditions of use affecting exposure

#### 32.2.1. Control of environmental exposure: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to fresh water (ERC 6a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 5.361 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 <= 1.93E3 tonnes/year
Emission days >= 360 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>
Receiving surface water flow >= 2E6 m3/day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) >= 1E3
Assumed effluent discharge flow from site >= 2E3 m3/day

#### 32.2.2. Control of environmental exposure: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to marine water (ERC 6a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq 5.361$ 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 $\leq 1.93E3$ tonnes/year
Emission days $\geq 360$ 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) $\geq 100$
Assumed effluent discharge flow from site $\geq 2E3$ m <sup>3</sup> /day

### 32.2.3. Control of worker exposure: Handling of powders (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.

### 32.2.4. Control of worker exposure: Handling of massive material (PROC 21)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.
Physical form of product; Massive object
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.

### 32.2.5. Control of worker exposure: Wet chemical reaction (PROC 4, PROC 2, PROC 3, PROC 1)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.
Physical form of product: Solution.
<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>
Covers use at ambient temperatures.
Use in closed process

### 32.2.6. Control of worker exposure: Control room operations (PROC 2)

<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>
Closed and ventilated (positive pressure) control room, contamination from outside is minimised by measures such as dust-captures for shoes.
<b>Other conditions affecting workers exposure</b>
For supervision activities it is important to also respect the RMMs as prescribed in the contributing scenarios for the specific process that are supervised, as relevant.

### 32.2.7. 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).

### 32.2.8. 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.

## 32.3. Exposure estimation and reference to its source

### 32.3.1. Environmental release and exposure: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to fresh water (ERC 6a)

Release route	Release rate	Release estimation method
Water	0.927 kg/day	Estimated release factor
Air	0.373 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.23E-3 mg/L (EUSES 2.1.2)	0.455
Sediment (freshwater)	42.25 mg/kg dw (PEC sediment calculation method for metals)	0.388
Agricultural soil	16.24 mg/kg dw (EUSES 2.1.2)	0.543

### 32.3.2. Environmental release and exposure: Intermediate use of nickel metal for the manufacture of nickel salts - Direct discharge to marine water (ERC 6a)

Release route	Release rate	Release estimation method
Water	0.927 kg/day	Estimated release factor
Air	0.373 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	3.63E-3 mg/L (EUSES 2.1.2)	0.422
Sediment (marine water)	103.5 mg/kg dw (PEC sediment calculation method for metals)	0.95
Agricultural soil	16.24 mg/kg dw (EUSES 2.1.2)	0.543

### 32.3.3. Worker exposure: Handling of powders (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

### 32.3.4. Worker exposure: Handling of massive material (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9E-3 mg/m <sup>3</sup> (Measured data)	0.18
Inhalation, local, long term	9E-3 mg/m <sup>3</sup> (Measured data)	0.18
Inhalation, local, acute	0.037 mg/m <sup>3</sup> (Measured data)	< 0.01
Dermal, local, long term	5.18 µg/cm <sup>2</sup> (Measured data)	0.148

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.18

### 32.3.5. Worker exposure: Wet chemical reaction (PROC 4, PROC 2, PROC 3, PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.012 mg/m <sup>3</sup> (Measured data)	0.24
Inhalation, local, long term	0.012 mg/m <sup>3</sup> (Measured data)	0.24
Inhalation, local, acute	0.047 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		0.24

### 32.3.6. Worker exposure: Control room operations (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	7E-3 mg/m <sup>3</sup> (Measured data)	0.14
Inhalation, local, long term	7E-3 mg/m <sup>3</sup> (Measured data)	0.14
Inhalation, local, acute	0.022 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		0.14

### 32.3.7. 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

### 32.3.8. 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 <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

## 32.4. 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".