

## 15. ES 15: Use at industrial sites; Use of nickel-containing steel and other alloy powders

### 15.1. Title section

Product category: Base metals and alloys (PC 7)

Sector of use: Manufacture of basic metals, including alloys (SU 14)

<b>Environment</b>	
1: Use of nickel-containing steel and other alloy powders - Discharge to fresh water via municipal sewage treatment plant	ERC 5
2: Use of nickel-containing steel and other alloy powders - Direct discharge to fresh water	ERC 5
3: Use of nickel-containing steel and other alloy powders - Direct discharge to marine water	ERC 5
<b>Worker</b>	
4: Handling of dusty raw materials	PROC 26
5: Handling of massive raw materials	PROC 21
6: Melting, casting and tapping	PROC 23, PROC 22, PROC 3
7: Atomisation	PROC 27a, PROC 1
8: Powder handling and packaging	PROC 26
9: Powder pressing	PROC 1
10: Wet cleaning	PROC 28
11: Cleaning/removal of dust	PROC 28

### 15.2. Conditions of use affecting exposure

#### 15.2.1. Control of environmental exposure: Use of nickel-containing steel and other alloy powders - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.91 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 <= 200 tonnes/year
Emission days >= 220 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 biological sewage treatment plant</b>
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
<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 $\geq 1.8E4$ m <sup>3</sup> /day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) $\geq 10$

### 15.2.2. Control of environmental exposure: Use of nickel-containing steel and other alloy powders - Direct discharge to fresh water (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq 4.077$ 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 $\leq 897$ tonnes/year
Emission days $\geq 220$ 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 $\geq 1.98E5$ m <sup>3</sup> /day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) $\geq 100$
Assumed effluent discharge flow from site $\geq 2E3$ m <sup>3</sup> /day

### 15.2.3. Control of environmental exposure: Use of nickel-containing steel and other alloy powders - Direct discharge to marine water (ERC 5)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq 4.077$ 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 $\leq 897$ tonnes/year
Emission days $\geq 220$ 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

### 15.2.4. Control of worker exposure: Handling of dusty raw materials (PROC 26)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: High.
Physical form of product: Solid, powder / dust, massive forms.
<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.

### 15.2.5. Control of worker exposure: Handling of massive raw materials (PROC 21)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Low (abrasion based).
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.

### 15.2.6. Control of worker exposure: Melting, casting and tapping (PROC 23, PROC 22, PROC 3)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: High (temperature based).
Physical form of product: Molten.
<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>
Assumes process temperature up to 1.6E3 °C
Semi-closed system
Use of an integrated local exhaust ventilation is required.

### 15.2.7. Control of worker exposure: Atomisation (PROC 27a, PROC 1)

<b>Product (article) characteristics</b>
Physical form of product: Molten.
<b>Technical and organisational conditions and measures</b>
Use in closed process
Use of an integrated local exhaust ventilation is required.

### 15.2.8. Control of worker exposure: Powder handling and packaging (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.

### 15.2.9. Control of worker exposure: Powder pressing (PROC 1)

<b>Product (article) characteristics</b>
Physical form of product; Solid, high dustiness
<b>Technical and organisational conditions and measures</b>
Use in closed process
Use of an integrated local exhaust ventilation is required.

### 15.2.10. 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).

### 15.2.11. 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.
------

### 15.3. Exposure estimation and reference to its source

#### 15.3.1. Environmental release and exposure: Use of nickel-containing steel and other alloy powders - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

Release route	Release rate	Release estimation method
Water	0.045 kg/day	Estimated release factor
Air	0.019 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.88E-3 mg/L (EUSES 2.1.2)	0.546
Sediment (freshwater)	59.1 mg/kg dw (PEC sediment calculation method for metals)	0.542
Sewage Treatment Plant	0.014 mg/L (EUSES 2.1.2)	0.041
Agricultural soil	16.58 mg/kg dw (EUSES 2.1.2)	0.555

#### 15.3.2. Environmental release and exposure: Use of nickel-containing steel and other alloy powders - Direct discharge to fresh water (ERC 5)

Release route	Release rate	Release estimation method
Water	0.204 kg/day	Estimated release factor
Air	0.084 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.63E-3 mg/L (EUSES 2.1.2)	0.511
Sediment (freshwater)	52.6 mg/kg dw (PEC sediment calculation method for metals)	0.483
Agricultural soil	16.20 mg/kg dw (EUSES 2.1.2)	0.542

#### 15.3.3. Environmental release and exposure: Use of nickel-containing steel and other alloy powders - Direct discharge to marine water (ERC 5)

Release route	Release rate	Release estimation method
Water	0.204 kg/day	Estimated release factor
Air	0.084 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	1.03E-3 mg/L (EUSES 2.1.2)	0.12
Sediment (marine water)	35.2 mg/kg dw (PEC sediment calculation method for metals)	0.323

Protection target	Exposure estimate	RCR
Agricultural soil	16.20 mg/kg dw (EUSES 2.1.2)	0.542

#### 15.3.4. Worker exposure: Handling of dusty raw materials (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

#### 15.3.5. Worker exposure: Handling of massive raw materials (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
Combined, systemic, long term		0.18

#### 15.3.6. Worker exposure: Melting, casting and tapping (PROC 23, PROC 22, PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.016 mg/m <sup>3</sup> (Measured data)	0.32
Inhalation, local, long term	0.016 mg/m <sup>3</sup> (Measured data)	0.32
Inhalation, local, acute	0.065 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		0.32

#### 15.3.7. Worker exposure: Atomisation (PROC 27a, PROC 1)

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	0.017 mg/m <sup>3</sup> (Measured data)	< 0.01
Dermal, local, long term	0.076 µg/cm <sup>2</sup> (Measured data)	< 0.01
Combined, systemic, long term		0.12

#### 15.3.8. Worker exposure: Powder handling and packaging (PROC 26)

Route of exposure and type of effects	Exposure estimate	RCR
---------------------------------------	-------------------	-----

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

### 15.3.9. Worker exposure: Powder pressing (PROC 1)

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	0.017 mg/m <sup>3</sup> (Measured data)	< 0.01
Dermal, local, long term	0.076 µg/cm <sup>2</sup> (Measured data)	< 0.01
Combined, systemic, long term		0.12

### 15.3.10. 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

### 15.3.11. 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

## 15.4. 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".