

## 20. ES 20: Use at industrial sites; Use of nickel metal in thin film deposition by evaporation technique

### 20.1. 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 thin film deposition by evaporation technique - only air	ERC 7
Worker	
2: Thin film deposition by evaporation technique	PROC 1
3: Sand blasting of contaminated/coated protective shields	PROC 2
4: Cleaning/removal of dust	PROC 28

### 20.2. Conditions of use affecting exposure

#### 20.2.1. Control of environmental exposure: Use of nickel metal in thin film deposition by evaporation technique - only air (ERC 7)

Amount used, frequency and duration of use (or from service life)
Daily amount per site $\leq 1E-4$ 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 $\leq 1E-4$ tonnes/year
Emission days $\geq 1$ 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
The substance should not be released to water
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

#### 20.2.2. Control of worker exposure: Thin film deposition by evaporation technique (PROC 1)

Amount used (or contained in articles), frequency and duration of use/exposure
Covering handling of very small quantities.
Technical and organisational conditions and measures
Use in closed process

#### 20.2.3. Control of worker exposure: Sand blasting of contaminated/coated protective shields (PROC 2)

Product (article) characteristics
Physical form of product; Massive object
Maximum emission potential covered in this ES: High (abrasion based).

<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
Use of an integrated local exhaust ventilation with high efficiency is required.
Automated task

#### 20.2.4. 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. Vapour deposition chamber cleaned manually.
<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.

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

#### 20.3.1. Environmental release and exposure: Use of nickel metal in thin film deposition by evaporation technique - only air (ERC 7)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	3E-6 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Agricultural soil	16.2 mg/kg dw (EUSES 2.1.2)	0.542

#### 20.3.2. Worker exposure: Thin film deposition by evaporation technique (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

#### 20.3.3. Worker exposure: Sand blasting of contaminated/coated protective shields (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.031 mg/m <sup>3</sup> (Measured data)	0.62
Inhalation, local, long term	0.031 mg/m <sup>3</sup> (Measured data)	0.62
Inhalation, local, acute	0.157 mg/m <sup>3</sup> (Measured data)	0.013
Dermal, local, long term	0.76 µg/cm <sup>2</sup> (Measured data)	0.022
Combined, systemic, long term		0.62

#### 20.3.4. 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

#### 20.4. 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".