

21. ES 21: Use at industrial sites; Use of nickel metal for thermal spraying

21.1. Title section

Product category: Base metals and alloys (PC 7), Metal surface treatment products (PC 14), Welding and soldering products, flux products (PC 38)

Sector of use: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment. (SU 17)

Environment	
1: Use of nickel metal for thermal spraying - only air	ERC 5
Worker	
2: Powder handling	PROC 26
3: Hand operated metal spraying operations	PROC 7
4: Thermal spraying and coating operations	PROC 7
5: Finishing	PROC 24, PROC 21, PROC 10
6: Cleaning/removal of dust	PROC 28

21.2. Conditions of use affecting exposure

21.2.1. Control of environmental exposure: Use of nickel metal for thermal spraying - only air (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site \leq 0.021 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 5 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
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.

21.2.2. Control of worker exposure: Powder handling (PROC 26)

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.
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21.2.3. Control of worker exposure: Hand operated metal spraying operations (PROC 7)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium (spraying process).
Physical form of product: Solution.
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
Use of an integrated local exhaust ventilation with highly efficient ventilation (99-99.99% efficiency).
Ensure that a spraying booth is used.
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.

21.2.4. Control of worker exposure: Thermal spraying and coating operations (PROC 7)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium (spraying process). The emission potential may be lower for some coating operations.
Physical form of product: Molten. In cold coating processes, solutions and/or powders may be used.
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
Ensure automation of the process as far as technically feasible
Use in closed process
Use of an integrated local exhaust ventilation with high efficiency is required.

21.2.5. Control of worker exposure: Finishing (PROC 24, PROC 21, PROC 10)

Product (article) characteristics
Physical form of product; Massive object
Maximum emission potential covered in this ES: Low (abrasion based).
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
Use in closed process
Use of an integrated local exhaust ventilation with high efficiency is required.

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

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.

21.3. Exposure estimation and reference to its source

21.3.1. Environmental release and exposure: Use of nickel metal for thermal spraying - only air (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	0.104 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

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

21.3.2. 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

21.3.3. Worker exposure: Hand operated metal spraying operations (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8E-3 mg/m ³ (Measured data)	0.16
Inhalation, local, long term	8E-3 mg/m ³ (Measured data)	0.16
Inhalation, local, acute	0.05 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.16

21.3.4. Worker exposure: Thermal spraying and coating operations (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m ³ (Measured data)	0.26
Inhalation, local, long term	0.013 mg/m ³ (Measured data)	0.26

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, acute	0.039 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.26

21.3.5. Worker exposure: Finishing (PROC 24, PROC 21, PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5E-3 mg/m ³ (Measured data)	0.1
Inhalation, local, long term	5E-3 mg/m ³ (Measured data)	0.1
Inhalation, local, acute	0.014 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.1

21.3.6. 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

21.4. 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".