

27. ES 27: Use at industrial sites; Use of nickel metal in the production of abrasive tools

27.1. Title section

Product category: Metal surface treatment products (PC 14)

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

Environment	
1: Use of nickel metal in the production of abrasive tools - Direct discharge to fresh water	ERC 5
2: Use of nickel metal in the production of abrasive tools - only air	ERC 5
Worker	
3: Handling of low dusty materials	PROC 26
4: Mixing and blending	PROC 5, PROC 4, PROC 3
5: Deposition of nickel bonding layer for abrasive grains	PROC 13
6: Testing of solution composition	PROC 15
7: Packaging	PROC 21
8: Wet cleaning	PROC 28
9: Cleaning/removal of dust	PROC 28

27.2. Conditions of use affecting exposure

27.2.1. Control of environmental exposure: Use of nickel metal in the production of abrasive tools - Direct discharge to fresh water (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site $\leq 1E-3$ 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 ≤ 0.2 tonnes/year
Emission days ≥ 200 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 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 ³ /day
No discharge to marine water assumed
Receiving water dilution (fresh or marine) ≥ 10
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day

27.2.2. Control of environmental exposure: Use of nickel metal in the production of abrasive tools - only air (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.015 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 <= 3 tonnes/year
Emission days >= 200 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.

27.2.3. Control of worker exposure: Handling of low dusty materials (PROC 26)

Product (article) characteristics
Physical form of product; Solid, low 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
Ensure automation of the process as far as technically feasible
Semi-closed system

27.2.4. Control of worker exposure: Mixing and blending (PROC 5, PROC 4, PROC 3)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
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
Covers use at ambient temperatures.

27.2.5. Control of worker exposure: Deposition of nickel bonding layer for abrasive grains (PROC 13)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Physical form of product: Solution.
Technical and organisational conditions and measures
Automated task
Use of a surfactant/wetting/foaming agent is required.
Use of a rim ventilation is required.

27.2.6. Control of worker exposure: Testing of solution composition (PROC 15)

Product (article) characteristics
Physical form of product: Solution.
Amount used (or contained in articles), frequency and duration of use/exposure
Amount per use < 1 kg
Technical and organisational conditions and measures
Use of an extraction hood is required.

27.2.7. Control of worker exposure: Packaging (PROC 21)

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

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

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Physical form of product: Solution and other liquid materials, e.g. suspensions are also covered.
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 machines such as power sweeper, no direct manual cleaning.
Covers use at ambient temperatures.
Conditions and measures related to personal protection, hygiene and health evaluation
APF of RPE = 10 (90% respiratory protection).

27.2.9. 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.

27.3. Exposure estimation and reference to its source

27.3.1. Environmental release and exposure: Use of nickel metal in the production of abrasive tools - Direct discharge to fresh water (ERC 5)

Release route	Release rate	Release estimation method
Water	5E-3 kg/day	Estimated release factor
Air	2E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.08E-3 mg/L (EUSES 2.1.2)	0.434
Sediment (freshwater)	38.2 mg/kg dw (PEC sediment calculation method for metals)	0.35
Agricultural soil	16.2 mg/kg dw (EUSES 2.1.2)	0.542

27.3.2. Environmental release and exposure: Use of nickel metal in the production of abrasive tools - only air (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	0.03 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

27.3.3. Worker exposure: Handling of low dusty materials (PROC 26)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, acute	0.035 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	1 µg/cm ² (Measured data)	0.029
Combined, systemic, long term		0.24

27.3.4. Worker exposure: Mixing and blending (PROC 5, PROC 4, PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, long term	0.012 mg/m ³ (Measured data)	0.24
Inhalation, local, acute	0.047 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.24

27.3.5. Worker exposure: Deposition of nickel bonding layer for abrasive grains (PROC 13)

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	0.015 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.076 µg/cm ² (Measured data)	< 0.01
Combined, systemic, long term		0.1

27.3.6. Worker exposure: Testing of solution composition (PROC 15)

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

27.3.7. Worker exposure: Packaging (PROC 21)

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

27.3.8. Worker exposure: Wet cleaning (PROC 28)

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

27.3.9. 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

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.64

27.4. 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”.