

12. ES 12: Use at industrial sites; Use of nickel-containing brazing alloys in industrial settings

12.1. Title section

Product category: Base metals and alloys (PC 7)

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

Environment	
1: Use of nickel-containing brazing alloys in industrial settings - Discharge to fresh water via municipal sewage treatment plant	ERC 5
2: Use of nickel-containing brazing alloys in industrial settings - Direct discharge to marine water	ERC 5
Worker	
3: Melting and furnace brazing	PROC 23, PROC 22
4: Manual brazing	PROC 25
5: Packaging	PROC 21
6: Wet cleaning	PROC 28
7: Cleaning/removal of dust	PROC 28

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Use of nickel-containing brazing alloys in industrial settings - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site $\leq 2.2E-3$ 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 ≤ 0.55 tonnes/year
Emission days ≥ 252 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 biological sewage treatment plant
Assumed domestic sewage treatment plant flow $\geq 2E3$ m ³ /day
Municipal sewage treatment plant is assumed.
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

12.2.2. Control of environmental exposure: Use of nickel-containing brazing alloys in industrial settings - Direct discharge to marine water (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site $\leq 2.2E-3$ 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 ≤ 0.55 tonnes/year
Emission days ≥ 252 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
No discharge to freshwater assumed
Receiving water dilution (fresh or marine) ≥ 100
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day

12.2.3. Control of worker exposure: Melting and furnace brazing (PROC 23, PROC 22)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium (temperature based).
Physical form of product: Molten.
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
Assumes process temperature up to $1.6E3$ °C
Local exhaust ventilation
Semi-closed system

12.2.4. Control of worker exposure: Manual brazing (PROC 25)

Product (article) characteristics
Maximum emission potential covered in this ES: High (temperature based).
Physical form of product: Molten.
Technical and organisational conditions and measures
High temperature
Local exhaust ventilation
Conditions and measures related to personal protection, hygiene and health evaluation
Dermal contact with the substance has to be excluded.

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

Product (article) characteristics
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Maximum emission potential covered in this ES: Very low.
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.

12.2.6. 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).

12.2.7. 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.

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: Use of nickel-containing brazing alloys in industrial settings - Discharge to fresh water via municipal sewage treatment plant (ERC 5)

Release route	Release rate	Release estimation method
Water	0.022 kg/day	Estimated release factor
Air	0.33 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.37E-3 mg/L (EUSES 2.1.2)	0.475
Sediment (freshwater)	45.85 mg/kg dw (PEC sediment calculation method for metals)	0.421
Sewage Treatment Plant	6.6E-3 mg/L (EUSES 2.1.2)	0.02

Protection target	Exposure estimate	RCR
Agricultural soil	16.41 mg/kg dw (EUSES 2.1.2)	0.549

12.3.2. Environmental release and exposure: Use of nickel-containing brazing alloys in industrial settings - Direct discharge to marine water (ERC 5)

Release route	Release rate	Release estimation method
Water	0.022 kg/day	Estimated release factor
Air	0.33 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	3.79E-4 mg/L (EUSES 2.1.2)	0.044
Sediment (marine water)	18.16 mg/kg dw (PEC sediment calculation method for metals)	0.167
Agricultural soil	16.22 mg/kg dw (EUSES 2.1.2)	0.543

12.3.3. Worker exposure: Melting and furnace brazing (PROC 23, PROC 22)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.016 mg/m ³ (Measured data)	0.32
Inhalation, local, long term	0.016 mg/m ³ (Measured data)	0.32
Inhalation, local, acute	0.065 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.32

12.3.4. Worker exposure: Manual brazing (PROC 25)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.015 mg/m ³ (Measured data)	0.3
Inhalation, local, long term	0.015 mg/m ³ (Measured data)	0.3
Inhalation, local, acute	0.044 mg/m ³ (Measured data)	< 0.01
Dermal, local, long term	0.76 µg/cm ² (Measured data)	0.022
Combined, systemic, long term		0.3

12.3.5. 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

12.3.6. 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

12.3.7. 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

12.4. 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".