

1. Title		Version 6, 2015
GES 19 Production of silver-nickel contact material		
Life cycle	End use - DU of Ni metal	
Free short title	Production of Ag/Ni contact material	
Systematic title based on use descriptor	SU: SU 15 Manufacture of fabricated metal products, except machinery PC7: Base metals and alloys ERC: ERC 3: Formulation in materials PROC: PROC 26: Handling of solid inorganic substances at ambient temperature PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substance bound in materials PROC 25: Hot work operations with metals PROC 0: Cleaning and maintenance	
Processes, tasks, activities covered (environment)	Production of Ag/Ni contact material	
Processes, tasks, activities covered (workers)	Raw material handling, blending, pressing, sintering, post sintering finishing (extrusion, rolling, annealing), cleaning and maintenance	
2. Operational conditions and risk management measures		
2.1 Control of environmental exposure		
Environmental related free short title	Production of Ag/Ni contact material	
Systematic title based on use descriptor (environment)	ERC 3: Formulation in materials	
Processes, tasks, activities covered (environment)	Production of Ag/Ni contact material	
Environmental Assessment Method	Estimates based on monitoring local and regional concentrations are used for calculation of PEC	
Product characteristics		
Metallic nickel as powder. Concentration of Ni >99.5%, AgNi wire, profile, contact tips (Ni-content 10-40%)		
Amounts used		
Maximum daily use at a site	120 kg/day metallic Ni powder	
Maximum annual use at a site	ES 1 & 2: 20 tonnes Ni per year (average)	
Frequency and duration of use		
Pattern of release to the environment	252 days per year (median 50 th %, 2007)	
Environment factors not influenced by risk management		
Receiving surface water flow rate	ES 1 Direct discharge: 18,000 m ³ /d (Effluent Site: 2000 m ³ /d)	
Dilution capacity, freshwater	ES 1 Direct discharge: 10 (default)	
Dilution capacity, marine	ES 2 Marine discharge: 100 (default)	
Other given operational conditions affecting environmental exposure		
Not given		
Technical conditions and measures at process level (source) to prevent release		
Not given		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Waste water:		
On site waste water treatment in a physio-chemical plant by chemical precipitation and sedimentation.(Efficiency 98%)		
ES 1 Freshwater direct discharge: Release factor after on-site treatment: 2.66 g/T		
ES 2 Marine direct discharge: Release factor after on-site treatment: 2.66 g/T		

Air:	
Treatment of air emission in exhaust system with fabric filters and safety filters. (Efficiency 99.9%)	
ES 1 & 2: Release factor after on-site treatment: 18.31 g/T	
Organizational measures to prevent/limit release from site	
None	
Conditions and measures related to municipal sewage treatment plant	
Municipal Sewage Treatment Plant (STP)	No
Discharge rate of the Municipal STP	Not relevant
Incineration of the sludge of the Municipal STP	Not relevant
Conditions and measures related to external treatment of waste for disposal	
Hazardous wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the nickel content of the waste is elevated enough, internal or external recovery/recycling might be considered.	
Fraction of daily/annual use expected in waste:	
<ul style="list-style-type: none"> - Nickel producers = 0.05 % - DU: stainless steel and alloy steels = 0.6 % - DU: nickel alloys, copper alloys, foundry, batteries, catalysts, chemicals, dyes and others = 0.5 % - DU: Plating = 3% 	
Appropriate waste codes:	
01 03 07*, 02 01 10*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 10 08 04, 10 08 08*, 10 08 09, 10 08 15*, 10 08 16, 10 10 03, 10 10 05*, 10 10 07*, 10 10 09*, 10 10 10, 10 10 11*, 11 02 07*, 12 01 03*, 12 01 04, 15 01 04*, 15 01 10*, 16 01 04*, 16 01 06*, 16 01 08*, 16 06 02*, 16 06 05, 16 08 02*, 16 08 03*, 17 04 07*, 17 04 09*, 19 09 04*, 19 10 02*, 19 12 03*	
Suitable disposal: Keep separate and dispose of to either	
<ul style="list-style-type: none"> - Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. - Hazardous landfill operated under Directive 1999/31/EC. 	
Conditions and measures related to external recovery of waste	
Shredders pre-treating metal wastes should have a maximum release factors to air of 0.0015 after RMM and no releases to water and soil.	
Q _{max, local} (shredding)=26kg Ni/day	
(Note: This Q _{max, local} for shredders is based on the existing information at the moment of the update. It will be reviewed when new information is available from the BREF for shredding)	
2.2 Control of workers exposure	
Production of Ni contact material	
Workers related free short title	Production of Ag/Ni contact material
Use descriptor covered	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substance bound in materials

	PROC 25: Hot work operations with metals PROC 26: Handling of solid inorganic substances at ambient temperature PROC 0: Cleaning and maintenance						
Processes, tasks, activities covered	Production of Ag/Ni contact material						
Assessment Method	Estimation of exposure based on measured data						
Product characteristic							
Metallic nickel as powder. Concentration of Ni >99.5%, Ag/Ni wire, profile, contact tips (Ni-content 10-40%)							
Amounts used							
Not relevant							
Frequency and duration of use/exposure							
8 hour shifts							
Human factors not influenced by risk management							
Respiration volume under conditions of use				Not relevant			
Room size and ventilation rate				Not relevant			
Area of skin contact with the substance under conditions of use				Not relevant			
Body weight				Not relevant			
Other given operational conditions affecting workers exposure							
Maintain clean workplace to prevent accumulation of powders and dusts on surfaces. Use of water or vacuum cleaner with HEPA filter to remove dust from workplace during cleaning and maintenance. Oral: Good workplace hygiene practice							
Technical conditions and measures at process level (source) to prevent release							
Enclosure of blending and pressing operations is required. Extraction of fumes from high temperature processes is required to prevent discharge to workplace air (sintering, annealing)							
Technical conditions and measures to control dispersion from source towards the worker							
LEV shall be in place where powder release is possible							
Organisational measures to prevent /limit releases, dispersion and exposure							
None							
Conditions and measures related to personal protection, hygiene and health evaluation							
Inhalation: Use of RPE (FFP3, APF = 10) is required for tasks likely to lead to short term peaks in exposure levels such as sampling of blended powder and during cleaning and maintenance. Dermal: Gloves and other suitable protective clothing are required if any direct contact with raw materials is likely and for cleaning and maintenance operations.							
3. Exposure and risk estimation							
Environment							
ERC 3 Production of Ni contact material							
Compartment	Unit	PNEC	PEC _{Regional}	C _{local}	PEC	RCR	Methods for calculation of environmental concentrations Measured values, Tier 3-RWC
ES 1: Freshwater direct discharge							
Freshwater	µg Ni/L	7.1	2.9	0.01	2.91	0.41	
Sediment	mg Ni/kg	136	33.5	0.2	33.7	0.25	
Terrestrial	mg Ni/kg	29.9	16.2	<0.01	16.20	0.54	
ES 2: Marine direct discharge							
Marine water	µg Ni/L	8.6	0.3	<0.01	0.30	0.04	
Sediment	mg Ni/kg	136	16.1	0.02	16.1	0.12	
Terrestrial	mg Ni/kg	29.9	16.2	<0.01	16.20	0.54	
Workers							
PROC 8a, PROC 5, PROC 22, PROC 24, PROC 25, PROC 26, PROC 0: Production of Ni contact material							
	Unit	DNEL	Exposure concentration	RCR	Methods for calculation of exposure		
Dermal							

Acute systemic	mg Ni /kg/day	-	NR		
Acute local	mg Ni /cm ² /day	-	NR		
Long-term systemic	mg Ni /kg/day	-	NR		
Long-term local	mg Ni /cm ² /day	0.035	0.009	0.257	Estimated 75 th percentile for dermal exposure to insoluble Ni
Inhalation					
Acute local	mg Ni /m ³	4.0	0.1	0.025	Short term peak exposure estimated as 10 x 75 th percentile of long-term average exposure. A factor of 10 takes account of the extreme variability in exposure concentration through time that arises during powder handling operations. Assumes use of RPE with protection factor = 10 during sampling and cleaning and maintenance.
Long-term systemic and local	mg Ni /m ³	0.05	0.01	0.2	Reasonable estimate of the 75 th percentile of long-term mean exposure based on information from other powder metallurgy processes and expert judgement

NR: Not Relevant

Acute local inhalation

DNEL based on respirable size aerosols. Equivalent inhalable fraction levels expected to be at least 3-fold higher

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment

Scaling tool: Metals EUSES IT tool (free download: <http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool>)

Scaling of the release to air and water environment includes:

Refining of the release factor to air and waste water and/or and the efficiency of the air filter and wastewater treatment facility.

Scaling of the PNEC for aquatic environment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Scaling of the PNEC for soil compartment by using a tiered approach for correction for bioavailability and background concentration (C_{local} approach).

Workers

Scaling considering duration and frequency of use

Collect process monitoring data with an inhalable sampler. The simultaneous use of a respirable sampler is encouraged. Use aerosol particle size information, when available, to confirm the appropriate use of the inhalable DNEL of 0.05 mg Ni/m³.

Respirable fraction exposure levels should be kept below 0.01 mg Ni/m³.

For further information and guidance on exposure scenarios, available tools, and scaling options, please visit the Nickel

Man via Environment exposure and risk characterisation assessments for the production of silver-nickel contact materials

Inhalation is the critical exposure pathway for humans via the environment. The PEC for air at site neighbouring residential areas should be lower than the chronic inhalation DNEL for the general public of 20 ng Ni/m³ as annual average in PM₁₀ in order to demonstrate adequate control of risk (RCR < 1) for Man via the Environment (MvE).

Hereto a Generic safe use Exposure Scenario for MvE was developed based on the EUSES model. The MvE GES is defined as the product of tonnage (T) and emission factor to air (EF) being lower than 18000 g Ni/year. The value of 18000 g Ni/year is derived by using EUSES model to back-calculate the product of T and EF that results in a local air concentration (C_{local}) of 15.5 ng Ni/m³. The value of 15.5 is derived from the difference between the DNEL of 20 ng Ni/m³ and the EU regional background concentration (C_{regional}) of 4.5 ng Ni/m³ (P90 annual concentration for 2012).

Generic safe use ES for all sectors according to Tier 1 (EUSES model)

Sector	Tonnage (Ni T /year)	Emission factor (g Ni/T)	Tonnage × emission factor (g /year)	C _{local} (ng/m ³)	C _{regional} (ng/m ³)	PEC _{local} (ng/m ³)	RCR = PEC/DNEL (DNEL= 20 ng/m ³)
All	T	EF	T × EF < 18000	<15.5	4.5*	<20	<1

*: EU average of country P90 annual Ni concentrations (2012)

If a site is not compliant with these conditions, meaning that the product of tonnage and emission factor is above 18000 g Ni/year, a tiered approach including site-specific modelling can be applied to demonstrate safe use