



9.10. Exposure scenario 10: Service life (consumers) - Service life of articles coated with metallic silver

Environment contributing scenario(s):			SPERC
CS 1	Service life of articles coated with metallic silver	ERC 11a	Eurometaux SPERC 11A.3.v1
Consumer contributing scenario(s):			SCED
CS 2	Electrical/electronics articles coated with metallic silver	AC 2	
CS 3	Glass articles coated with metallic silver	AC 4	
CS 4	Metal articles coated with metallic silver	AC 7	

Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):

ES3: Use at industrial sites - Use of silver nitrate in coating

ES4: Use at industrial sites - Use of silver nitrate in the production of catalysts

Further description of the use:

After metal surface treatment the treated articles are not expected to contain silver nitrate since the substance is transformed to silver metal during deposition on the article.

Explanation on the approach taken for the ES:

The treated articles contain silver in metallic form with > 99.9% purity, as a result the articles don't contain residual silver nitrate in concentrations above those triggering classification.

Silver metal (EC 231-131-3) is registered in the > 1000 T/y tonnage band. Massive silver has no classification and silver powder is classified for environment. As a worst case approach the PNECs for silver powder have been used. Both massive silver and silver powder don't have DNELs. No hazards have been identified.

9.10.1. Env CS 1: Service life of articles coated with metallic silver (ERC 11a)

Assessment entity group used for the assessment of this contributing scenario: ENV RA

This service life step is not relevant for silver nitrate anymore since the substance transformed to silver metal.

9.10.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily local widespread use amount: $\leq 1.1E-4$ tonnes/day
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: Dedicated recollection infrastructure required
Other conditions affecting environmental exposure
• Place of use: Indoor
• Water contact during use: No
• Biological STP: Standard [Effectiveness Water: 80.1%]

9.10.1.2. Releases

The releases have been estimated on the basis of SPERC Eurometaux SPERC 11A.3.v1: Service life of metallic articles with no emission

Modification date: 09/09/2021

Description of activities/processes covered by the SPERC

Service life of metallic articles with no emission

Service life covers foreseen use of articles by consumers.



The service life covers only uses with no water-contact (either by using the article away from water or if the metal in the article is encapsulated or coated to avoid water-contact) and uses with no emissions from the article. Processes such as sanding, polishing, machining etc. are not covered.

Product/substance domain:

Scope of the SPERC

Substance groups or function:

Included in the metal definition (Eurometaux SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds.

Type of products: Products are metallic articles where the metal is either encapsulated / there is a mechanical barrier (to avoid direct contact with water) or there is no intended contact with water because incompatible with water (because this would lead to disfunctioning of the article): electronic and electric devices such as screens, monitors, IT and telecommunication equipment (e.g. mobile phone), large household appliances, small household appliances, photovoltaic cells, vehicles, etc..

Excluded type of products: brake pads, tyres, monitoring instruments.

Explanation for the release factor to water:

Metal in either encapsulated / there is a mechanical barrier (to avoid direct contact with water) or there is no intended contact with water because incompatible with water (because this would lead to disfunctioning of the article) AND there is no abrasion of the article

Explanation for the release factor to air:

Metals and metal compounds do not volatilise. Due to the massive physical state in service life, there is no dust formation that can become air-borne.

Explanation for the release factor to soil:

ERC default: not applicable

Sub-SPERC Eurometaux SPERC 11A.3.v2 is used for Ag dissolved:

The local releases to the environment are reported in the following table.

Table 9.94. Local releases to the environment

Release	Assessment entity	Release factor	Local release rate
Water	Ag dissolved	0%	0 kg/day
Air	Ag dissolved	0%	- kg/day
Non agricultural soil	Ag dissolved	0%	- kg/day

Releases to waste

Release factor to external waste: 54 %

Recycling rates for WEEE in the EU was in 2016 46% (range between 30% and 96%) (Eurostat). Potential fraction for solid waste is then 54%.

9.10.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.95. Exposure concentrations and risks for the environment and man via the environment

Protection target	Assessment entity	Exposure concentration	Risk quantification
Fresh water	Ag dissolved	Local PEC: 6.06E-6 mg/L RCR = 0.132	Final RCR = 0.132
Sediment (freshwater)	Ag dissolved	Local PEC: 1.155 mg/kg dw RCR = 2.64E-3	Final RCR < 0.01
Marine water	Ag dissolved	Local PEC: 1.91E-6 mg/L RCR = 2.22E-3	Final RCR < 0.01
Sediment (marine water)	Ag dissolved	Local PEC: 0.364 mg/kg dw RCR = 8.31E-4	Final RCR < 0.01



Protection target	Assessment entity	Exposure concentration	Risk quantification
Sewage Treatment Plant	Ag dissolved	Local PEC: 0 mg/L RCR = 0	Final RCR < 0.01
Agricultural soil	Ag dissolved	Local PEC: 0.096 mg/kg dw RCR = 0.091	Final RCR = 0.091
Man via environment - Inhalation (systemic effects)	Ag dissolved	Concentration in air: 8.53E-8 mg/m ³ RCR = 5.69E-7	Final RCR < 0.01
Man via environment - Oral	Ag dissolved	Exposure via food consumption: 3.84 µg/kg bw/day (Measured data: See section 9.0.3.6) RCR = 0.035	Final RCR = 0.035
Man via environment - combined routes			Final RCR = 0.035

Remarks on measured exposure:

See section 9.0.3.6 for Ag dissolved:

Identity of the substance used: Ag

Explanation: Worst case exposure of 3.84 µg Ag/kg bw/day from food (section 9.0.3.6) was taken forward to the risk characterisation.

The intake via drinking water calculated with CHESAR was 3-4 orders of magnitudes lower compared to the intake via food and has thus not been taken into account.

9.10.2. Cons CS 2: Electrical/electronics articles coated with metallic silver (AC 2)

This service life step is not relevant for silver nitrate anymore since the substance transformed to silver metal. Silver metal (EC 231-131-3) is registered in the > 1000 T/y tonnage band. Massive silver has no classification and silver powder is only classified for environment. Both massive silver and silver powder don't have DNELs. No hazards have been identified.

9.10.3. Cons CS 3: Glass articles coated with metallic silver (AC 4)

This service life step is not relevant for silver nitrate anymore since the substance transformed to silver metal. Silver metal (EC 231-131-3) is registered in the > 1000 T/y tonnage band. Massive silver has no classification and silver powder is only classified for environment. Both massive silver and silver powder don't have DNELs. No hazards have been identified.

9.10.4. Cons CS 4: Metal articles coated with metallic silver (AC 7)

This service life step is not relevant for silver nitrate anymore since the substance transformed to silver metal. Silver metal (EC 231-131-3) is registered in the > 1000 T/y tonnage band. Massive silver has no classification and silver powder is only classified for environment. Both massive silver and silver powder don't have DNELs. No hazards have been identified.