



9.8. Exposure scenario 8: Use at industrial sites - Use of silver-containing preparations in industrial settings (adhesives, lubricants, inks, electrodes...)

Product category used: PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 14: Metal surface treatment products; PC 18: Ink and Toners; PC 21: Laboratory Chemicals; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 29: Pharmaceuticals; PC 42: Electrolytes for batteries

Sector of use: SU 9: Manufacture of fine chemicals; SU 16: Manufacture of computer, electronic and optical products, electrical equipment; SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.; SU 20: Health services

Environment contributing scenario(s):		
CS 1	Use of silver-containing preparations in industrial settings (adhesives, lubricants, inks, electrodes...)	ERC 5
Worker contributing scenario(s):		
CS 2	Raw material handling	PROC 8b , PROC 21
CS 3	Powder handling	PROC 4 , PROC 26
CS 4	Handling of solutions/suspensions	PROC 8b , PROC 9
CS 5	Wet process	PROC 1 , PROC 13, PROC 15, PROC 3, PROC 4, PROC 5
CS 6	Hot process	PROC 22 , PROC 23
CS 7	Mechanical processes	PROC 14 , PROC 10, PROC 17, PROC 18
CS 8	Spraying	PROC 7
CS 9	Packaging	PROC 8b , PROC 21, PROC 9
CS 10	Cleaning and maintenance	PROC 8a , PROC 19, PROC 26, PROC 28

Subsequent service life exposure scenario(s):

ES18: Service life (professional worker) - Service life of silver-containing articles in professional settings

ES19: Service life (consumers) - Service life of massive objects containing silver metal at ambient temperature (including trade bars)

ES20: Service life (consumers) - Service life of articles containing silver being encapsulated in the internal part of the product

ES21: Service life (consumers) - Service life of silver in jewellery used by consumers

ES22: Service life (consumers) - Service life of silver in cutlery and silver table ware

ES23: Service life (consumers) - Service life of installed dental appliances and fillings containing silver

9.8.1. Env CS 1: Use of silver-containing preparations in industrial settings (adhesives, lubricants, inks, electrodes...) (ERC 5)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form

9.8.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
<ul style="list-style-type: none"> Daily use amount at site: <= 0.2 tonnes/day <i>Based on 251 days per year.</i>
<ul style="list-style-type: none"> Annual use amount at site: <= 50 tonnes/year <i>Based on the maximum value reported by the companies.</i>



Technical and organisational conditions and measures
<ul style="list-style-type: none"> The substance should not be released to air <i>Emissions to air are not allowed in this scenario</i>
<ul style="list-style-type: none"> The substance should not be released to water <i>Emissions to surface water or to the sewage system are not allowed in this scenario</i>
Conditions and measures related to biological sewage treatment plant
<ul style="list-style-type: none"> Biological STP: None [Effectiveness Water: 0%]
Conditions and measures related to external treatment of waste (including article waste)
<ul style="list-style-type: none"> Particular considerations on the waste treatment operations: No (low concentration) <i>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 silver content of the waste is elevated enough, internal or external recovery/recycling might be considered.</i> <i>Appropriate waste codes: 06 05 02*, 08 01 11, 08 03 12*, 09 01 01*, 09 01 03*, 09 01 04*, 09 01 05*, 09 01 06*, 09 01 13*, 10 06 06*, 10 07 01, 10 07 02, 10 07 03, 10 07 04, 10 07 05, 11 01 09*, 15 01 10*, 15 02 02*, 16 01 18, 16 03 03*, 16 08 01, 16 11 04</i> <i>Suitable disposal: Hazardous waste produced during the manufacture and downstream use is sent to a recycler only marginal amounts are sent to a landfill or an incinerator. Waste containing silver is recycled for almost a 100%</i> <i>A detailed assessment has been performed on modelled and measured data and is reported in the Waste report (ARCHE, 2013)</i>
Other conditions affecting environmental exposure
<ul style="list-style-type: none"> Receiving surface water flow rate: $\geq 1.8E4$ m³/day
<ul style="list-style-type: none"> Discharge rate of effluent: $\geq 2E3$ m³/day

9.8.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.29. Local releases to the environment

Release	Assessment entity	Release estimation method	Explanations
Water	Silver in powder form	Estimated release factor	<p>Release factor before on site RMM: 0% Release factor after on site RMM: 0% Local release rate: 0 kg/day Explanation: 7 companies have provided a questionnaires and all of them has reported no emissions to water. Empty cans and cartridges, scrap as well as cleaning whipes with material residues are destined for recycling, network washing is not silver burdened. Waste water is disposed in a controlled manner or collected and individually disposed or recycled.</p>
Air	Silver in powder form	Estimated release factor	<p>Release factor before on site RMM: 0% Release factor after on site RMM: 0% Local release rate: 0 kg/day Explanation: 7 companies have provided a questionnaires and 6 of them has reported no emissions to air. The remaining one did not provide data.</p>
Non agricultural soil	Silver in powder form	Estimated release factor	<p>Release factor after on site RMM: 0% Explanation: No direct emissions to soil.</p>



Releases to waste

Release factor to external waste: 0 %

A detailed assessment has been performed on modelled and measured data and is reported in the Waste report (ARCHE, 2013)

9.8.1.3. 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 9.30. Exposure concentrations and risks for the environment and man via the environment

Protection target	Assessment entity	Exposure concentration	Risk quantification
Fresh water	Silver in powder form	Local PEC: 6.06E-6 mg/L RCR = 0.151	Final RCR = 0.151
Sediment (freshwater)	Silver in powder form	Local PEC: 1.155 mg/kg dw RCR = 2.64E-3	Final RCR < 0.01
Marine water	Silver in powder form	Local PEC: 1.91E-6 mg/L RCR = 2.22E-3	Final RCR < 0.01
Sediment (marine water)	Silver in powder form	Local PEC: 0.364 mg/kg dw RCR = 8.31E-4	Final RCR < 0.01
Sewage Treatment Plant	Silver in powder form	Local PEC: 0 mg/L RCR = 0	Final RCR < 0.01
Agricultural soil	Silver in powder form	Local PEC: 0.096 mg/kg dw RCR = 0.068	Final RCR = 0.068

9.8.2. Worker CS 2: Raw material handling (PROC 8b, PROC 21)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.3. Worker CS 3: Powder handling (PROC 4, PROC 26)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.4. Worker CS 4: Handling of solutions/suspensions (PROC 8b, PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.5. Worker CS 5: Wet process (PROC 1, PROC 13, PROC 15, PROC 3, PROC 4, PROC 5)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.6. Worker CS 6: Hot process (PROC 22, PROC 23)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.7. Worker CS 7: Mechanical processes (PROC 14, PROC 10, PROC 17, PROC 18)



Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.8. Worker CS 8: Spraying (PROC 7)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.9. Worker CS 9: Packaging (PROC 8b, PROC 21, PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).

9.8.10. Worker CS 10: Cleaning and maintenance (PROC 8a, PROC 19, PROC 26, PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Silver in powder form
Exposure assessment and risk characterisation are not required (see scope under 9.0.4).