



9.15. Exposure scenario 15: Widespread use by professional workers - Soldering and brazing in professional settings

Product category used: PC 7: Base metals and alloys; PC 33: Semiconductors; PC 38: Welding and soldering products, flux products

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

Environment contributing scenario(s):		
CS 1	Soldering and brazing in professional settings-indoor	ERC 8c
CS 2	Soldering and brazing in professional settings-indoor	ERC 8f
Worker contributing scenario(s):		
CS 3	Soldering and brazing	PROC 25

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)

9.15.1. Env CS 1: Soldering and brazing in professional settings-indoor (ERC 8c)

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

9.15.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
<ul style="list-style-type: none"> Daily local widespread use amount: $\leq 2.75E-6$ tonnes/day <i>Since only limited information is available for professional use the same volume as for industrial use has been selected.</i>
Conditions and measures related to biological sewage treatment plant
<ul style="list-style-type: none"> Biological STP: Standard [Effectiveness Water: 80.1%]
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 amount) <i>Many of these products are recycled rather than disposed of (e.g. batteries, solar panels, soldered and electroplated articles) which will limit the potential emissions from them at the end of their lifecycle</i> <i>Fraction of daily/annual use expected in waste: 60% of all articles, at least 40% of the silver used in articles is recycled.</i> <i>Appropriate waste codes: 09 01 07, 09 01 08, 16 01 04*, 16 01 06, 16 02 11*, 16 02 13*, 16 02 14, 16 02 15*, 16 02 16, 16 06 05, 20 01 33*, 20 01 34, 20 01 35*, 20 01 36, 20 01 40, 20 03 01, 20 03 07</i> <i>Suitable Disposal:</i> <i>Waste from end-of-life articles can be disposed of as municipal waste, except when they are separately regulated, like electronic devices, batteries, vehicles, etc.</i> <i>Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference Document on the Best available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002).</i> <i>A detailed assessment has been performed on modelled and measured data and is reported in the Waste report (ARCHE, 2013)</i>

9.15.1.2. 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 9.49. Local releases to the environment



Release	Assessment entity	Release estimation method	Explanations
Water	Silver in powder form	Estimated release factor	Release factor before on site RMM: 1E-5% Release factor after on site RMM: 1E-5% Local release rate: 2.75E-10 kg/day Explanation: Wastewater emissions are based on measured data which are considered representative of downstream use.
Air	Silver in powder form	Estimated release factor	Release factor before on site RMM: 0.5% Release factor after on site RMM: 0.5% Explanation: No measured emission data. Emissions from SPERC factsheet 'Use of metals in metallic coating v2.1'
Non agricultural soil	Silver in powder form	Estimated release factor	Release factor after on site RMM: 0% Explanation: No direct release to soil.

Releases to waste

Release factor to external waste: 60 %

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

9.15.1.3. 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 9.50. 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 = 0.152	Final RCR = 0.152
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: 2.74E-11 mg/L RCR = 1.09E-9	Final RCR < 0.01
Agricultural soil	Silver in powder form	Local PEC: 0.096 mg/kg dw RCR = 0.068	Final RCR = 0.068

9.15.2. Env CS 2: Soldering and brazing in professional settings-indoor (ERC 8f)

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

9.15.2.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
<ul style="list-style-type: none"> Daily local widespread use amount: $\leq 2.75E-6$ tonnes/day <p><i>Since only limited information is available for professional use the same volume as for industrial use has been selected.</i></p>
Conditions and measures related to biological sewage treatment plant



• Biological STP: Standard [Effectiveness Water: 80.1%]
Conditions and measures related to external treatment of waste (including article waste)
<p>• Particular considerations on the waste treatment operations: No (low amount)</p> <p><i>Many of these products are recycled rather than disposed of (e.g. batteries, solar panels, soldered and electroplated articles) which will limit the potential emissions from them at the end of their lifecycle</i></p> <p><i>Fraction of daily/annual use expected in waste: 60% of all articles, at least 40% of the silver used in articles is recycled.</i></p> <p><i>Appropriate waste codes: 09 01 07, 09 01 08, 16 01 04*, 16 01 06, 16 02 11*, 16 02 13*, 16 02 14, 16 02 15*, 16 02 16, 16 06 05, 20 01 33*, 20 01 34, 20 01 35*, 20 01 36, 20 01 40, 20 03 01, 20 03 07</i></p> <p><i>Suitable Disposal:</i></p> <p><i>Waste from end-of-life articles can be disposed of as municipal waste, except when they are separately regulated, like electronic devices, batteries, vehicles, etc.</i></p> <p><i>Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference Document on the Best available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002).</i></p> <p><i>A detailed assessment has been performed on modelled and measured data and is reported in the Waste report (ARCHE, 2013)</i></p>

9.15.2.2. 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 9.51. 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: 1E-5%</p> <p>Release factor after on site RMM: 1E-5%</p> <p>Local release rate: 2.75E-10 kg/day</p> <p>Explanation: Wastewater emissions are based on measured data which are considered representative of downstream use.</p>
Air	Silver in powder form	Estimated release factor	<p>Release factor before on site RMM: 0.5%</p> <p>Release factor after on site RMM: 0.5%</p> <p>Explanation: No measured emission data. Emissions from SPERC factsheet 'Use of metals in metallic coating v2.1'</p>
Non agricultural soil	Silver in powder form	Estimated release factor	<p>Release factor after on site RMM: 0%</p> <p>Explanation: No direct release to soil.</p>

Releases to waste

Release factor to external waste: 60 %

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

9.15.2.3. 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 9.52. 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	Local PEC: 6.06E-6 mg/L	Final RCR = 0.152



Protection target	Assessment entity	Exposure concentration	Risk quantification
	form	RCR = 0.152	
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: 2.74E-11 mg/L RCR = 1.09E-9	Final RCR < 0.01
Agricultural soil	Silver in powder form	Local PEC: 0.096 mg/kg dw RCR = 0.068	Final RCR = 0.068

9.15.3. Worker CS 3: Soldering and brazing (PROC 25)

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).