9.3. Exposure scenario 3: Service life (consumers) - Service life / Use of batteries

Market sector: Batteries

Environment contributing scenario(s):			**SPERC**
CS 1	Service life / Use of batteries	ERC 11a	Eurometaux SPERC 11A.2.v2
Consumer contributing scenario(s):			**SCED**
CS 2	Service life / Use of batteries	AC 3	

Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):
ES2: Use at industrial sites - Use of disilver oxide in the production of batteries

9.3.1. Env CS 1: Service life / Use of batteries (ERC 11a)

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

9.3.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily local widespread use amount: <= 5.5E-6 tonnes/day
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: Other *Dedicated recollection infrastructure required according to the EU Batteries and Accumulators Directive*
Other conditions affecting environmental exposure
• Place of use: Indoor/Outdoor
• Water contact during use: No
• Biological STP: Standard [Effectiveness Water: 80.1%]

9.3.1.2. Releases

The releases have been estimated on the basis of SPERC Eurometaux SPERC 11A.2.v2: Service life of batteries, indoor/outdoor
Modification date: 09/09/2021

Description of activities/processes covered by the SPERC

Service life of batteries, indoor/outdoor
Service life includes foreseen uses of batteries by consumers

Product/substance domain:

Scope of the SPERC
Substance groups or function: Metals in batteries
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: Batteries (lead-acid batteries, nickel-cadmium batteries etc.)

Explanation for the release factor to water:

There is no release to water because batteries are closed containers during service life, there is no leaking during service life and accidental release is not to be considered (ECHA Guidance R.16, Feb 2016, p. 171-172: no losses during explosion or car accidents)

Explanation for the release factor to air:

Metals and metal compounds do not volatile. Due to the massive physical state in service life and the containment in a battery, 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.2.v2 is used for Ag dissolved:
The local releases to the environment are reported in the following table.

Table 9.24. 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: 20 %
The EU Batteries and Accumulators Directive requires the following targets to be met:
- a 45% collection rate for waste portable batteries to be met by September 2016;
- a prohibition on the disposal by landfill or incineration of waste industrial and automotive batteries in effect setting a 100% collection and recycling target; and
- the setting of recycling efficiencies to ensure that a high proportion of the weight of waste batteries is recycled (65% of lead acid batteries, 75% of nickel-cadmium batteries and 50% of other waste batteries).
In practice, the recycling rates are larger. The EU automotive lead-based battery collection and recycling rate for the period 2010/2012 is 99% (Eurobat, ILA, ACEA). Portable battery collection varies in the EU between 19% and 71% for the year 2015 with an average around 40% (EPBA). Given that battery recycling rates have further increased since then and will further increase in the future (given the regulatory and economic drivers), a reasonable recycling rate of 80% and a potential release fraction of 20% to solid waste is assumed.

9.3.1.3. 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 9.25. 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
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/m³ 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			Final RCR = 0.035

Protection target	Assessment entity	Exposure concentration	Risk quantification
environment - combined routes			

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.

9.3.2. Cons CS 2: Service life / Use of batteries (AC 3)

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

9.3.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Consumers 3.1 (R15)
• Exposure via inhalation route: Inhalation exposure is considered to be not relevant *No exposure to substance possible as substance is inside battery.*	TRA Consumers 3.1 (R15)
• Exposure via dermal route: No dermal contact *No exposure to substance possible as substance is inside battery.*	TRA Consumers 3.1 (R15)
• Exposure via oral route: Oral exposure is considered to be not relevant *No exposure to substance possible as substance is inside battery.*	TRA Consumers 3.1 (R15)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Frequency of use over a year: Frequent	TRA Consumers 3.1 (R15)
• Frequency of use over a day: = 1 events per day	TRA Consumers 3.1 (R15)
Information and behavioral advice for consumers	
• Adult/child assumed: Adult	TRA Consumers 3.1 (R15)

9.3.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.26. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Disilver oxide	0 mg/m³ (TRA Consumers) RCR = 0	Final RCR < 0.01
Dermal, systemic, long term	Disilver oxide	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Oral, systemic, long term	Disilver oxide	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Risk characterisation

Qualitative risk characterisation (Eye, local):
No exposure to substance possible as substance is inside battery.