

Cosmetic Europe SPERC fact sheet - Industrial use in formulation of cosmetic products which involve cleaning of manufacturing equipment with organic solvents

Section	Content
SPERC Title	Industrial use in formulation of cosmetic products which involve cleaning of manufacturing equipment with organic solvents
SPERC code	
	<p>Cosmetics Europe 2.2.a.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (large scale)</p> <p>Cosmetics Europe 2.2.b.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (medium scale)</p> <p>Cosmetics Europe 2.2.c.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (small scale)</p>
Scope	
	<p>Covers the whole process of formulation as it occurs in the manufacturing of cosmetic products. This includes storing, mixing, packaging of substances (as part of mixtures) and equipment cleaning, maintenance and associated laboratory activities.</p> <p>The SPERCs are relevant for operations which discharge their wastewater to treatment by a municipal sewage treatment plant.</p> <p>The SPERCs cover small, medium and large operations, which produce less than 1000 tons, up to 10,000 tons or more than 10,000 tons of finished products per year, respectively.</p> <p><i>Substance Domain: All (see Narrative Description)</i></p>
Related use descriptors	
	Main User Group: SU 3
	Sector of Use: SU10
	Environmental Release Class: ERC 2
	Process Categories: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC 9, PROC14, PROC 15.
	Product categories: PC 39

Operational conditions		Operational conditions – Phrases	
	Cosmetics Europe 2.2.a.v2	Process optimized for highly efficient use of raw materials.	
	Cosmetics Europe 2.2.b.v2	Process optimized for efficient use of raw materials.	
	Cosmetics Europe 2.2.c.v2	Process with efficient use of raw materials.	
		Operational conditions - Free text background	
	Cosmetics Europe 2.2.a.v2	General good practice: e.g. trained staff, spill protection including waste reuse. Advanced technology used in process e.g Closed automated process Closed transfer system Centralized process control	
	Cosmetics Europe 2.2.b.v2	General good practice: e.g. trained staff, spill protection. Technology used in process e.g Closed batch process Semi Closed transfer system Batch production of final product	
	Cosmetics Europe 2.2.c.v2	General good practice: e.g. trained staff, spill protection. Used in process e.g Batch process Batch production of final product	
Obligatory onsite RMMs		RMM - Phrase	RMM-Efficiency (RE_{SPERC})
	Cosmetics Europe 2.2.a.v2	No wastewater treatment required.	0
	Cosmetics Europe 2.2.b.v2		0
	Cosmetics Europe 2.2.c.v2		0
Substance use rate		Phrase	Value (M_{SPERC})
	Cosmetics Europe 2.2.a.v2	Maximum daily site tonnage (kg/day):	16,700
	Cosmetics Europe 2.2.b.v2		4,500
	Cosmetics Europe 2.2.c.v2		450
	Justification		
M _{SPERC} can be used by the registrant when starting the environmental assessment. M _{SPERC} -represents an indicative worst case value for the substance use rate per site. The M _{SPERC} values have been estimated in dependence of the size of the operation, the number of days emitting, and the concentration of the substance in a finished product (i.e. mixture). See M _{SPERC} -derivation in Appendix.			

Days emitting		Phrase	Value (d)			
	Cosmetics Europe 2.2.a.v2	Emission Days (days/year):	250			
	Cosmetics Europe 2.2.b.v2		250			
	Cosmetics Europe 2.2.c.v2		250			
Release factors		Values (per pathway)				
		To air	To water	To soil	To waste	
	Cosmetics Europe 2.2.a.v2	0	0	0	0	
	Cosmetics Europe 2.2.b.v2	0	0	0	0	
	Cosmetics Europe 2.2.c.v2	0	0	0	0	
		Justification				
	<p>Releases to Air: Air emission controls are not applicable as there is no direct release to air.</p> <p>Releases to water via wastewater: No wastewater treatment required.</p> <p>Releases to soil: Must be avoided.</p> <p>Releases to waste: Not relevant – no obligatory RMM which divert substances to waste.</p>					
Optional risk management measures		Type of RMM	Efficiency			
	Cosmetics Europe 2.2.a.v2 Cosmetics Europe 2.2.b.v2 Cosmetics Europe 2.2.c.v2	n/a	n/a			
	<p>Typical emission reducing equipment/procedures in the cosmetic product plants may comprise: - not required / no emissions assumed</p>					
Narrative description	Industrial use in formulation of cosmetics and body care products which involve cleaning of manufacturing equipment with organic solvents					
	<p>For economic reasons, formulation of mixtures requires optimized use of raw materials for inclusion into products. Losses of raw materials via volatilization are negligible. Manufacturing equipment is cleaned with organic solvents. The resulting solvent rinsing are collected and disposed of according to local regulations or recycled.</p> <p>Technical comments</p> <ul style="list-style-type: none"> - Before treatment means: emissions as entering an on-site biological WWTP, or if absent, as leaving the site towards a municipal WWTP. 					

	<ul style="list-style-type: none"> - It is assumed for simplicity that 1 kg cosmetic product (excl. water) represents ~ 1 kg COD. Actual average value for the chemical ingredients may range from 1-2. - Emissions to <u>soil or solid waste</u> are not discussed here, as justified in IFRA (2009), these are considered negligible. Emissions to <u>air</u> are discussed below. 		
Scaling	Scaling options are based on the comparison of the $M_{Safe\ SPERC}$ with M_{Site} and changes due to RMM (RE) and/or dilution situation on site (q and $G_{Effluent}$).		
	Scalable parameters	Parameter description	Values – SPERC /ES
	$M_{Safe\ SPERC}$, (kg/d)	Amount which can be safely used based on the SPERC	M_{Safe} – outcome of chemical safety assessment
	$RE_{Total, SPERC}$	Removal efficiency assumed in the SPERC	0
	q_{SPERC}	Factor by which receiving surface water. dilutes the sewage after treatment	10
	$G_{Effluent, SPERC}$ (m ³ /d)	Discharge rate of sewage.	2,000
	Scaling condition		
	<i>risk driven by wastewater treatment plant microbes</i> $[M_{Safe, SPERC} \times (1 - RE_{Total, SPERC})] / G_{Effluent, SPERC} \geq [M_{Site} \times (1 - RE_{Total, Site})] / G_{Effluent, Site}$		
	<i>risk driven by freshwater/freshwater sediments, marine water/marine water sediments</i> $[M_{Safe, SPERC} \times (1 - RE_{Total, SPERC})] / (G_{Effluent, SPERC} \times q_{SPERC}) \geq [M_{Site} \times (1 - RE_{Total, Site})] / (G_{Effluent, Site} \times q_{Site})$		
	Site-specific parameters	Parameter description	Values – Site
	M_{Site} , (kg/d)	Amount which is actually used on-site	To be determined by Downstream User
	$RE_{Total, Site}$	Removal efficiency realized through RMMs on site	
	q_{Site}	Factor by which receiving surface water. dilutes the sewage after treatment	
	$G_{Effluent, Site}$	Discharge rate of sewage.	

Appendix: M_{SPERC}-Derivation

M_{SPERC} can be used by the registrant when starting the environmental assessment. M_{SPERC} represents an indicative worst case value for the substance use rate per site. M_{SPERC} is calculated according to: $M_{SPERC} = M_{Finished} \times C_{SP} \times T_{Emission,SPERC}^{-1}$ with C_{SP} = Exemplary concentration of substance in finished product, M_{Finished} = the amount of finished product manufactured (per year), T_{Emission,SPERC} = number of days emitting. Typical parameters values are given in Table 1. M_{Finished} - ranges correspond to the tonnage ranges of finished product as defined by Royal Haskoning (2009) for formulators. The M_{Finished} -ranges are to help formulators find out which SPERC is relevant for their operation. M_{SPERC} values in brackets correspond to M_{Finished} production ranges. For M_{SPERC} distinct values founded on expert estimation are provided, since these are recommended as starting values for environmental exposure assessments, provided no better information is available.

Table 1: Derivation of the default substance use rate M_{SPERC} for use in formulation of cosmetic products which involve cleaning of manufacturing equipment with organic solvents. The derivation is based on typical values of the operational conditions for the various applications covered by this SPERC.

SPERC	Other Operational Conditions – Phrase	Operational Conditions – Values for selected parameters expressing the operational conditions for the SPERC ‘industrial use – formulation of granular cleaning and maintenance products.			
		M _{SPERC} (kg/d)	T _{Emission,SPERC} (days per year)	M _{Finished} (t/y)	C _{SP}
Cosmetics Europe 2.3.a.v2	Process optimized for highly efficient use of raw materials.	16700 (> 8000)	250*	>10000	20%
Cosmetics Europe 2.3.b.v2	Process optimized for efficient use of raw materials.	4500 (800-8000)	250*	1000-10000	20%
Cosmetics Europe 2.3.c.v2	Process with efficient use of raw materials.	450 (<800)	250*	<1000	20%

* T_{Emission,SPERC} has been selected according to Royal Haskoning review on large and medium compounds (Royal Haskoning, 2009)

Appendix - Determinant Lists

Cosmetics Europe 2.2.a.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (large scale)

Determinant Label	Quali-/ Quantitative	Value	Description of Value	Standard Phrase	Efficiency -if applicable
Type of Process	Qual	Solvent based process		Solvent based process	
Indoor/outdoor use	Qual	Indoor Use		Indoor	
Equipment cleaning	Qual	Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.		Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.	
Process efficiency	Qual	Process optimized for highly efficient use of raw materials (II)	<p>Typical measures may include e.g.</p> <ul style="list-style-type: none"> - Closed automated process and/or - Closed transfer system and/or - Centralized process control and/or - re-use of process grey water for cleaning - optimized and/or automated systems for the transport and handling of raw materials, that minimize overall exposure levels and incidental spills - Reduced number of transfer and cleaning operations through e.g. - Manufacturing of different products from one premix (masterbatch), to which certain ingredients are added to yield the final products. - Dedicated storage tanks for raw materials, premixes and final products <p>Recovery of materials through e.g.</p> <ul style="list-style-type: none"> - Recycling Residues of granular 	Process optimized for highly efficient use of raw materials.	

detergents in cleaning steps at packaging
or transfer lines into the slurries.

Cosmetics Europe 2.2.b.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (medium scale)

Determinant Label	Quali-/ Quantitative	Value	Description of Value	Standard Phrase	Efficiency -if applicable
Type of Process	Qual	Solvent based process		Solvent based process	
Indoor/outdoor use	Qual	Indoor Use		Indoor	
Equipment cleaning	Qual	Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.		Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.	
Process efficiency	Qual	Process optimized for efficient use of raw materials.	<p>Typical measures may include e.g.</p> <ul style="list-style-type: none"> - Closed batch systems and / or - Semi-closed transfer system and/or - Batch production of final product <p>Reduced number of transfer and cleaning operations through e.g.</p> <ul style="list-style-type: none"> - Dedicated storage tanks for raw materials, premixes and final products 	<p>Process optimized for efficient use of raw materials.</p>	

Cosmetics Europe 2.2.c.v2: Formulation of cosmetic products involving cleaning with organic solvents (varnish, removers, decorative cosmetics, spray, lacquer, fine fragrance, solar oil, solid products) (small scale)

Determinant Label	Quali-/ Quantitative	Value	Description of Value	Standard Phrase	Efficiency -if applicable
Type of Process	Qual	Solvent based process		Solvent based process	
Type of Process	Qual	Solvent based process			
Indoor/outdoor use	Qual	Indoor Use		Indoor	
Equipment cleaning	Qual	Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.		Equipment cleaned with organic solvent, washings are collected and disposed of as solvent waste.	
Process efficiency	Qual	Process with efficient use of raw materials.	Typically implemented measures for reducing emissions to waste water may include: - Closed batch systems	Process with efficient use of raw materials.	