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ANNEX

Contents

1. Overview of uses and Exposure Scenarios	2
2. Exposure scenario 1: Formulation - Formulation of cosmetic products	3
2.1. Environmental contributing scenario	3
2.1.1. Environmental contributing scenario: General scenario for formulation of cosmetic products (ERC 2)	3
2.2. Worker contributing scenario	4
2.2.1. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)	4
2.2.2. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2).....	4
2.2.3. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)	5
2.2.4. Worker contributing scenario 4: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5).....	6
2.2.5. Worker contributing scenario 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)	6
2.2.6. Worker contributing scenario 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	7
2.2.7. Worker contributing scenario 7: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9).....	7
2.2.8. Worker contributing scenario 8: Use as laboratory reagent (PROC 15).....	8
3. Exposure scenario 2: Use by professional worker - Professional use of cosmetic products containing the substance.....	8
3.1. Environmental contributing scenario	9
3.1.1. Environmental contributing scenario: Wide dispersive indoor use of processing aids in open systems (ERC 8a)	9
3.2. Worker contributing scenario	9
3.2.1. Worker contributing scenario 1: Hand-mixing with intimate contact and only PPE available. (PROC 19).....	9
3.2.2. Worker contributing scenario 2: Low energy manipulation of substances bound in materials and/or articles (PROC 21).....	10
4. Exposure scenario 3: Consumer Use of cosmetic products containing the substance (indoor)	11
4.1. Environmental contributing scenario: Wide dispersive indoor use of processing aids in open systems.....	11
4.1.1. Conditions of use	11
4.1.2. Releases	11
5. Exposure scenario 4: Consumer Use of cosmetic products containing the substance (outdoor)	12
5.1. Environmental contributing scenario: Wide dispersive outdoor use of processing aids in open systems.....	12
5.1.1. Conditions of use	12
5.1.2. Releases	12

1. OVERVIEW OF USES AND EXPOSURE SCENARIOS

Identifiers	Titles of exposure scenarios and the related contributing scenarios
ES1 - F1	Formulation - Formulation of cosmetic products - Environmental contributing scenario: general scenario for formulation of cosmetic products (ERC 2) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) - Use as laboratory reagent (PROC 15)
ES2 - PW1	Use by professional worker - Professional use of cosmetic products containing the substance - Wide dispersive indoor use of processing aids in open systems (ERC 8a) - Hand-mixing with intimate contact and only PPE available. (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21)
ES3 - C1	Consumer Use - Consumer Use of cosmetic products containing the substance (indoor) - Wide dispersive indoor use of processing aids in open systems (ERC 8a)
ES4 - C2	Consumer Use - Consumer Use of cosmetic products containing the substance (outdoor) - Wide dispersive outdoor use of processing aids in open systems (ERC 8d)

F= Formulation; PW= Professional use (workers); C= Consumer use

2. EXPOSURE SCENARIO 1: FORMULATION - FORMULATION OF COSMETIC PRODUCTS

Environment contributing scenario(s):	
Environmental contributing scenario: general scenario for formulation of cosmetic products	ERC 2
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9
Use as laboratory reagent	PROC 15

2.1. Environmental contributing scenario

2.1.1. Environmental contributing scenario: General scenario for formulation of cosmetic products (ERC 2)

2.1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.014 tonnes/day
• Annual use at a site: <= 2 tonnes/year
• Percentage of EU tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 70.02%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

2.1.1.2. Releases

Release	Release factor estimation method	Explanation / Justification
Water	Release factor	Initial release factor: 0.2% Final release factor: 0.2% Local release rate: 0.028 kg/day
Air	ERC based	Initial release factor: 2.5% Final release factor: 2.5% Local release rate: 0.35 kg/day
Soil	ERC based	Final release factor: 0.01%

2.2. Worker contributing scenario

2.2.1. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

2.2.1.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: Closed system (minimal contact during routine operations)	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: One hand face only (240 cm ²)	TRA Workers 3.0

2.2.2. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

2.2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0

	Method
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: Closed continuous process with occasional controlled exposure	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands face (480 cm ²)	TRA Workers 3.0

2.2.3. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

2.2.3.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: Closed batch process with occasional controlled exposure	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: One hand face only (240 cm ²)	TRA Workers 3.0

2.2.4. Worker contributing scenario 4: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

2.2.4.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Enhanced general ventilation (5-10 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands face (480 cm ²)	TRA Workers 3.0

2.2.5. Worker contributing scenario 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

2.2.5.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Enhanced general ventilation (5-10 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands (960 cm ²)	TRA Workers 3.0

2.2.6. Worker contributing scenario 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

2.2.6.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Enhanced general ventilation (5-10 air changes per hour)	TRA Workers 3.0
• Containment: Semi-closed process with occasional controlled exposure	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands (960 cm ²)	TRA Workers 3.0

2.2.7. Worker contributing scenario 7: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

2.2.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: Semi-closed process with occasional controlled exposure	TRA Workers 3.0

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands face (480 cm ²)	TRA Workers 3.0

2.2.8. Worker contributing scenario 8: Use as laboratory reagent (PROC 15)

2.2.8.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: One hand face only (240 cm ²)	TRA Workers 3.0

3. EXPOSURE SCENARIO 2: USE BY PROFESSIONAL WORKER - PROFESSIONAL USE OF COSMETIC PRODUCTS CONTAINING THE SUBSTANCE

Environment contributing scenario(s):	
Wide dispersive indoor use of processing aids in open systems	ERC 8a
Worker contributing scenario(s):	
Hand-mixing with intimate contact and only PPE available.	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21

3.1. Environmental contributing scenario

3.1.1. Environmental contributing scenario: Wide dispersive indoor use of processing aids in open systems (ERC 8a)

3.1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: $\leq 1.65E-5$ tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 70.02%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

3.1.1.2. Releases

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	Initial release factor: 100% Final release factor: 100% Local release rate: 0.016 kg/day
Air	ERC based	Initial release factor: 100% Final release factor: 100%
Soil	ERC based	Final release factor: 0%

3.2. Worker contributing scenario

3.2.1. Worker contributing scenario 1: Hand-mixing with intimate contact and only PPE available. (PROC 19)

3.2.1.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Enhanced general ventilation (5-10 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands and forearms (1980 cm2)	TRA Workers 3.0

3.2.2. Worker contributing scenario 2: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

3.2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: High	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: No [Effectiveness Dermal: 0%]	TRA Workers 3.0
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0
• Skin surface potentially exposed: Two hands and forearms (1980 cm2)	TRA Workers 3.0

4. EXPOSURE SCENARIO 3: CONSUMER USE OF COSMETIC PRODUCTS CONTAINING THE SUBSTANCE (INDOOR)

Environment contributing scenario(s):	
Wide dispersive indoor use of processing aids in open systems	ERC 8a

4.1. Environmental contributing scenario: Wide dispersive indoor use of processing aids in open systems

4.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: $\leq 8.25E-6$ tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 %
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Municipal STP: Yes [Effectiveness Water: 70.02%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

4.1.2. Releases

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	Initial release factor: 100% Final release factor: 100% Local release rate: 0.008 kg/day
Air	ERC based	Initial release factor: 100% Final release factor: 100%
Soil	ERC based	Final release factor: 0%

5. EXPOSURE SCENARIO 4: CONSUMER USE OF COSMETIC PRODUCTS CONTAINING THE SUBSTANCE (OUTDOOR)

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems	ERC 8d

5.1. Environmental contributing scenario: Wide dispersive outdoor use of processing aids in open systems

5.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: $\leq 8.25E-6$ tonnes/day
• Percentage of EU tonnage used at regional scale: = 10 %
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Municipal STP: Yes [Effectiveness Water: 70.02%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

5.1.2. Releases

Release	Release factor estimation method	Explanation / Justification
Water	ERC based	Initial release factor: 100% Final release factor: 100% Local release rate: 0.008 kg/day
Air	ERC based	Initial release factor: 100% Final release factor: 100%
Soil	ERC based	Final release factor: 20%