

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**EASTMAN**

## Probenz(TM) SG Sodium Benzoate, Food Grade, Kosher

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2018
3.5	21.02.2020	150000072050	Date of first issue: 21.03.2011
PRD		SDSGB / EN / 0001	

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

Trade name : Probenz(TM) SG Sodium Benzoate, Food Grade, Kosher

Product code : 32876-00, P3287600, P328760G, P3287604, P3287605, P3287601, P3287602, P3287603, P3287607, P328760B, P328760C, P328760D, P3287608, P328760A, P328760E, P328760F, P328760S

REACH Registration Number : 01-2119460683-35-0001

Substance name : Benzoic acid, sodium salt

CAS-No. : 532-32-1

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Preservative, antioxidant (food grade), cosmetic component  
Please refer to the Annex for a listing of uses.

Recommended restrictions on use : None known.

#### 1.3 Details of the supplier of the safety data sheet

Company : Eastman Chemical Company  
200 South Wilcox Drive  
37660-5280 Kingsport

Telephone : +14232292000

E-mail address of person responsible for the SDS : Visit our website at [www.EASTMAN.com](http://www.EASTMAN.com) or email [emnmsds@eastman.com](mailto:emnmsds@eastman.com)

#### 1.4 Emergency telephone

Tel. 111 NCEC +44 (0)1235 239 670

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Eye irritation, Category 2

H319: Causes serious eye irritation.

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### 2.2 Label elements

#### Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal Word : Warning

Hazard Statements : H319 Causes serious eye irritation.

Precautionary Statements : **Prevention:**  
P264 Wash skin thoroughly after handling.  
P280 Wear eye protection/ face protection.  
**Response:**  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P337 + P313 If eye irritation persists: Get medical advice/ attention.

### 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.  
None known.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Substance name : Benzoic acid, sodium salt

CAS-No. : 532-32-1

#### Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
sodium benzoate	532-32-1 208-534-8	> 99
Water	7732-18-5 231-791-2	< 1

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

If inhaled : Move to fresh air.  
Treat symptomatically.  
Get medical attention.

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- In case of skin contact : Wash off with soap and water.  
Take off all contaminated clothing immediately.  
Wash contaminated clothing before re-use.  
Get medical attention.
- In case of eye contact : In case of contact, immediately flush eyes with plenty of water  
for at least 15 minutes.  
Get medical advice/ attention.
- If swallowed : Seek medical advice.

### 4.2 Most important symptoms and effects, both acute and delayed

- Risks : Causes serious eye irritation.

### 4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treat symptomatically.

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## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

- Suitable extinguishing media : Use water spray to extinguish.  
Dry chemical  
Carbon dioxide (CO<sub>2</sub>)

- Unsuitable extinguishing media : None known.

### 5.2 Special hazards arising from the substance or mixture

- Hazardous combustion products : No hazardous combustion products are known

### 5.3 Advice for firefighters

- Special protective equipment for fire-fighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

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## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

- Personal precautions : Use personal protective equipment.  
Avoid release to the environment.

### 6.2 Environmental precautions

- Environmental precautions : Avoid release to the environment.

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### 6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Sweep up or vacuum up spillage and collect in suitable container for disposal.

### 6.4 Reference to other sections

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Advice on safe handling : Avoid contact with eyes.  
Wash thoroughly after handling.  
Minimize dust generation and accumulation.

Advice on protection against fire and explosion : Minimize dust generation and accumulation.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place.

### 7.3 Specific end use(s)

Specific use(s) : Antioxidant

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

Contains no substances with occupational exposure limit values.

#### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Routes of exposure	Potential health effects	Value
Benzoic acid, sodium salt	Workers	Inhalation	Long-term exposure, Systemic effects	3 mg/m <sup>3</sup>
	Workers	Inhalation	Long-term exposure, Local effects	0.1 mg/m <sup>3</sup>
	Workers	Skin contact	Long-term exposure, Systemic effects	62.5 mg/kg bw/day

#### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Benzoic acid, sodium salt	Water	0.13 mg/l
	Marine water	0.013 mg/l

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Substance name	Environmental Compartment	Value
	Aqua Intermittent	0.305 µg/l
	Fresh water sediment	1.76 mg/kg
	Marine sediment	0.176 mg/kg
	Soil	0.06 mg/kg
	Sewage treatment plant	10 mg/l
	Secondary Poisoning	300 mg/kg

### 8.2 Exposure controls

#### Engineering measures

Ensure adequate ventilation.

#### Personal protective equipment

Eye protection : Wear eye/face protection.

Hand protection

Remarks : Wear suitable gloves.

Skin and body protection : Any specific clothing information provided is based on published literature and manufacturer data.  
Body protection suitability and breakthrough time will differ depending on the specific use conditions.  
Clothing to be considered for this material may include sleeves, aprons, pants depending on the use and likelihood of skin contact.  
Please refer to the hand protection section for material type.

Respiratory protection : Wear respiratory protection.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance

: granules

Color : white

Odor : odourless

Odor Threshold : not determined

pH : 8

Melting point/range : 300 °C

Boiling point/boiling range : decomposes

Flash point : Not applicable

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Evaporation rate : not determined

Flammability (solid, gas) : Not applicable

Upper explosion limit / Upper flammability limit : not determined

Lower explosion limit / Lower flammability limit : not determined

Vapor pressure : Not applicable

Relative vapor density : not determined

Relative density : 1.44 (25 °C)

Solubility(ies)  
Water solubility : 556 g/l

Partition coefficient: n-octanol/water : log Pow: -2.27

Autoignition temperature : not determined

Decomposition temperature : not determined

Explosive properties : Not classified

Oxidizing properties : Not classified

### 9.2 Other information

Surface tension : 72.9 mN/m, 20 °C

Self-ignition : Not applicable

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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Stable

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : None known.

### 10.4 Conditions to avoid

Conditions to avoid

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: Heat, flames and sparks.

### 10.5 Incompatible materials

Materials to avoid

: Strong oxidizing agents

### 10.6 Hazardous decomposition products

Carbon dioxide (CO<sub>2</sub>)

Carbon monoxide

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## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

##### Product:

Acute oral toxicity

: Remarks: No data available

Acute inhalation toxicity

: Remarks: No data available

Acute dermal toxicity

: Remarks: No data available

##### Components:

**sodium benzoate:**

Acute oral toxicity

: LD50 Oral (Rat): > 2,000 mg/kg  
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity

: LC50 (Rat): > 2069 ppm  
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity

: LD50 Dermal (Rabbit): > 2,000 mg/kg  
Assessment: The substance or mixture has no acute dermal toxicity

#### Skin corrosion/irritation

##### Product:

Remarks

: No data available

##### Components:

**sodium benzoate:**

Species

: Rabbit

Exposure time

: 24 h

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Result : slight

### Serious eye damage/eye irritation

**Product:**

Remarks : No data available

**Components:**

**sodium benzoate:**

Species : Rabbit  
Exposure time : 24 h  
Result : Eye irritation

### Respiratory or skin sensitization

**Product:**

Remarks : No data available

**Components:**

**sodium benzoate:**

Test Type : OECD 429: LLNA  
Species : Mouse  
Result : non-sensitizing

### Germ cell mutagenicity

**Components:**

**sodium benzoate:**

Genotoxicity in vitro

: Test Type: Salmonella typhimurium assay (Ames test)  
Metabolic activation: +/- activation  
Method: Bacterial Reverse Mutation Assay  
Result: negative

Genotoxicity in vivo

: Species: Rat  
Application Route: oral: gavage  
Method: Mammalian Bone Marrow Chromosome Aberration Test  
Result: negative

### Carcinogenicity

**Product:**

Remarks : This information is not available.



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### Reproductive toxicity

#### Product:

Effects on fertility : Remarks: No data available

### STOT-single exposure

#### Product:

Remarks : No data available

#### Components:

##### sodium benzoate:

Assessment : Not classified

### STOT-repeated exposure

#### Product:

Remarks : No data available

#### Components:

##### sodium benzoate:

Assessment : Not classified

### Repeated dose toxicity

#### Components:

##### sodium benzoate:

Species : Rat  
NOAEL : 1,000 mg/kg  
Application Route : Oral Study

Species : Rat  
NOAEL : 2,500 mg/kg  
Application Route : Dermal Study

### Aspiration toxicity

#### Product:

No data available

### Information on likely routes of exposure

#### Product:

Inhalation : Remarks: None known.

Skin contact : Remarks: None known.

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Eye contact : Remarks: Causes serious eye irritation.

Ingestion : Remarks: None known.

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### SECTION 12: Ecological information

#### 12.1 Toxicity

##### Components:

##### **sodium benzoate:**

Toxicity to fish

: LC50 (Pimephales promelas (fathead minnow)): 484 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 100 mg/l  
Exposure time: 96 h

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (algae)): > 30.5 mg/l  
Exposure time: 72 h

Toxicity to fish (Chronic toxicity) : NOEC:: 10 mg/l  
Exposure time: 6 d  
Species: Danio rerio (zebra fish)

#### 12.2 Persistence and degradability

##### Components:

##### **sodium benzoate:**

Biodegradability

: Result: Readily biodegradable.  
Biodegradation: 75 %  
Exposure time: 30 d

#### 12.3 Bioaccumulative potential

No data available

#### 12.4 Mobility in soil

No data available

#### 12.5 Results of PBT and vPvB assessment

##### Product:

Assessment

: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

#### 12.6 Other adverse effects

No data available

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### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.

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### SECTION 14: Transport information

#### 14.1 UN number

Not regulated as a dangerous good

#### 14.2 UN proper shipping name

Not regulated as a dangerous good

#### 14.3 Transport hazard class(es)

Not regulated as a dangerous good

#### 14.4 Packing group

Not regulated as a dangerous good

#### 14.5 Environmental hazards

Not regulated as a dangerous good

#### 14.6 Special precautions for user

Not applicable

#### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable for product as supplied.

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### SECTION 15: Regulatory information

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Candidate List of Substances of Very High Concern for Authorization (Article 59).

: Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.  
Not applicable

#### The ingredients of this product are reported in the following inventories:

CH INV : On the inventory, or in compliance with the inventory

DSL : On the inventory, or in compliance with the inventory

AICS : On the inventory, or in compliance with the inventory

NZIoC : On the inventory, or in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

ISHL : On the inventory, or in compliance with the inventory

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KECI : On the inventory, or in compliance with the inventory

PICCS : On the inventory, or in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

TCSI : On the inventory, or in compliance with the inventory

TSCA : On the inventory, or in compliance with the inventory

### 15.2 Chemical Safety Assessment

None.

### SECTION 16: Other information

#### Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

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### Further information

#### Classification of the mixture:

Eye Irrit. 2

H319

#### Classification procedure:

Calculation method

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and re-release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GB / EN

## Annex: Exposure Scenarios

### Table of Contents

Number	Title
ES 1	Manufacture of substances (ERC1).
ES 2	Formulation & (re)packing of substances and mixtures (GEST2_I).Washing and cleaning products (PC35).
ES 3	Formulation & (re)packing of substances and mixtures (GEST2_I).Cosmetics, personal care products (PC39).
ES 4	Consumer use.Cosmetics, personal care products (PC39).
ES 5	Formulation & (re)packing of substances and mixtures (GEST2_I).Adhesives, sealants (PC1).
ES 6	Formulation & (re)packing of substances and mixtures (GEST2_I).Use in Powder Coatings.
ES 7	Formulation & (re)packing of substances and mixtures (GEST2_I).Use in coatings (GEST3_I, GEST3_P, GEST3_C).
ES 8	Formulation & (re)packing of substances and mixtures (GEST2_I).
ES 9	Industrial use.Use in Adhesive and Surface Treatment Products.
ES 10	Consumer use.Cosmetics, personal care products (PC39).
ES 11	Professional use.Hairdressing and other professional cosmetic services.
ES 12	Professional use.Washing and cleaning products (PC35).Biocidal products (PC8).Polishes and wax blends (PC31).



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applicable local and/or national regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow : 18,000 m3/d
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>
Prevent environmental discharge consistent with regulatory requirements.

### 1.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 1.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid

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<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 1.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C



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### 1.2.5. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 1.2.6. Control of worker exposure: Use as laboratory reagent (PROC15)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>

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Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 1.3. Exposure estimation and reference to its source

#### 1.3.1. Environmental release and exposure: Manufacture of substances (ERC1)

Release route	Release rate	Release estimation method
Water	1.3 kg/day	
Air	0 kg/day	

Protection Target	Exposure estimate	RCR
Freshwater	0.013 mg/L (EUSES v2.1)	0.096
Freshwater sediment	0.17 mg/kg dry weight (EUSES v2.1)	0.096
Marine water	0.00125 mg/L (EUSES v2.1)	0.096
Marine sediment	0.017 mg/kg dry weight (EUSES v2.1)	0.096
Sewage treatment plant	0.082 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.049 mg/kg dry weight (EUSES v2.1)	0.813
Predator's prey (freshwater)	0.061 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00606 mg/kg wet weight (EUSES v2.1)	< 0.01

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Top predator's prey (marine water)	0.00394 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.019 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000000 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.0055 mg/kg bw/day (EUSES v2.1)	< 0.01

### 1.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.1
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v3)	< 0.01

### 1.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	1
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.055

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### 1.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.044

### 1.3.5. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA worker v2.0)	0.219
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.244

### 1.3.6. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.15

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			worker v2.0)	
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.01

### 1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 2: Formulation & (re)packing of substances and mixtures (GEST2\_I).Washing and cleaning products (PC35).

#### 2.1. Title section

**Exposure Scenario name** : Formulation & (re)packing of substances and mixtures, Washing and cleaning products (including solvent based products)

**Structured Short Title** : Formulation & (re)packing of substances and mixtures (GEST2\_I).Washing and cleaning products (PC35).

Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed process, no likelihood of exposure	PROC1
CS 3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 4	Use in closed batch process (synthesis or formulation)	PROC3
CS 5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 6	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 8	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 9	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14
CS 10	Use as laboratory reagent	PROC15

#### 2.2. Conditions of use affecting exposure

##### 2.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 16.7 tonnes/day

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Annual amount per site	:	<= 4180 tonnes/year
Emission days	:	250 days/year
<b>Conditions and measures related to sewage treatment plant</b>		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m3/d
<b>Other conditions affecting environmental exposure</b>		
Indoor or outdoor use	:	Indoor use

### 2.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

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<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	



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Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 2.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.

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Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	

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<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.8. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

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### 2.2.9. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 %	

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Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 2.3. Exposure estimation and reference to its source

#### 2.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	1.67 kg/day	AISE SPERC 2.1.j.v1
Air	0 kg/day	AISE SPERC 2.1.j.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.015 mg/L (EUSES v2.1)	0.114
Freshwater sediment	0.201 mg/kg dry weight (EUSES v2.1)	0.114
Marine water	0.0014 mg/L (EUSES v2.1)	0.114
Marine sediment	0.02 mg/kg dry weight (EUSES v2.1)	0.114
Sewage treatment plant	0.105 mg/L (EUSES v2.1)	0.01
Soil	0.054 mg/kg dry weight (EUSES v2.1)	0.899
Predator's prey (freshwater)	0.063 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00625 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00398 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.02 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000002 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00575 mg/kg bw/day (EUSES v2.1)	< 0.01

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### 2.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.01
Dermal	systemic	long-term	0.003 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 2.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 2.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1

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			worker v2.0)	
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 2.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.025 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.025 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.25
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.019

### 2.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.013 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.013 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.125
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.026

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### 2.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.013 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.013 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.125
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.026

### 2.3.8. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.02 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.02 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.2
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.018

### 2.3.9. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033



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inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.039

### 2.3.10. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.017
inhalative	local	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.5
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.017

### 2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 3: Formulation & (re)packing of substances and mixtures (GEST2\_I).Cosmetics, personal care products (PC39).

#### 3.1. Title section

**Exposure Scenario name** : Formulation & (re)packing of substances and mixtures, Cosmetics, personal care products

**Structured Short Title** : Formulation & (re)packing of substances and mixtures (GEST2\_I).Cosmetics, personal care products (PC39).

Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed process, no likelihood of exposure	PROC1
CS 3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 4	Use in closed batch process (synthesis or formulation)	PROC3
CS 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 8	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 9	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14
CS 10	Use as laboratory reagent	PROC15

#### 3.2. Conditions of use affecting exposure

##### 3.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 1.6 tonnes/day

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Annual amount per site	:	<= 400 tonnes/year
Emission days	:	250
<b>Conditions and measures related to sewage treatment plant</b>		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m3/d
<b>Other conditions affecting environmental exposure</b>		
Indoor or outdoor use	:	Indoor use

### 3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

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<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	

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Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.2.5. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 3.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.

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Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	

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Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.2.8. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 3.2.9. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to 8 hours

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Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 3.3. Exposure estimation and reference to its source

#### 3.3.1. Environmental release and exposure: Formulation of preparations (ERC2)



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Release route	Release rate	Release estimation method
Water	1.6 kg/day	AISE SPERC 2.1.j.v1
Air	0 kg/day	AISE SPERC 2.1.j.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.014 mg/L (EUSES v2.1)	0.111
Freshwater sediment	0.195 mg/kg dry weight (EUSES v2.1)	0.111
Marine water	0.00144 mg/L (EUSES v2.1)	0.11
Marine sediment	0.019 mg/kg dry weight (EUSES v2.1)	0.11
Sewage treatment plant	0.1 mg/L (EUSES v2.1)	0.01
Agricultural soil	0.053 mg/kg dry weight (EUSES v2.1)	0.883
Predator's prey (freshwater)	0.062 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00613 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00396 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.02 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000002 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.0057 mg/kg bw/day (EUSES v2.1)	< 0.01

### 3.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.01
Dermal	systemic	long-term	0.003 mg/kg bw/day (ECETOC)	< 0.01

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			TRA worker v2.0)	
combined routes	systemic	long-term		< 0.01

### 3.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.036

### 3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 3.3.5. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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inhalative	systemic	long-term	0.025 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.025 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.25
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.03

### 3.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.017
inhalative	local	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.5
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.039

### 3.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.087 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.029
inhalative	local	long-term	0.087 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.875
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC	0.022

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			TRA worker v2.0)	
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.051

### 3.3.8. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.02
inhalative	local	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.6
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.031

### 3.3.9. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.023
inhalative	local	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.7
Dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.029

### 3.3.10. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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		tor	mate	
inhalative	systemic	long-term	< 0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	< 0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 4: Consumer use.Cosmetics, personal care products (PC39).

#### 4.1. Title section

<b>Exposure Scenario name</b>	:	Formulation & (re)packing of substances and mixtures, Consumer use
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<b>Structured Short Title</b>	:	Consumer use.Cosmetics, personal care products (PC39).
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Consumer		
<b>CS 1</b>	Cosmetics, personal care products	PC39

#### 4.2. Conditions of use affecting exposure

##### 4.2.1. Control of consumer exposure: Cosmetics, personal care products (PC39)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Exposure duration 60 min
Use frequency	: 1 per day
Other conditions affecting consumers exposure	
Body parts exposed	: Whole body
Indoor or outdoor use	: Indoor use

#### 4.3. Exposure estimation and reference to its source

##### 4.3.1. Consumer exposure: Cosmetics, personal care products (PC39)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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inhalative	systemic	long-term	(ECETOC TRA worker v2.0)	
inhalative	local	long-term	(ECETOC TRA worker v2.0)	
Dermal	systemic	long-term	29.16 mg/kg bw/day (ECETOC TRA worker v2.0)	0.933
oral	systemic	long-term	0 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	

#### 4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Not applicable

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### ES 5: Formulation & (re)packing of substances and mixtures (GEST2\_I).Adhesives, sealants (PC1).

#### 5.1. Title section

<b>Exposure Scenario name</b>	: Formulation & (re)packing of substances and mixtures, Adhesives, sealants
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<b>Structured Short Title</b>	: Formulation & (re)packing of substances and mixtures (GEST2_I).Adhesives, sealants (PC1).
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Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 3	Use in closed batch process (synthesis or formulation)	PROC3
CS 4	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 8	Roller application or brushing	PROC10
CS 9	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14

#### 5.2. Conditions of use affecting exposure

##### 5.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 3.64 tonnes/day
Annual amount per site	: <= 800 tonnes/year



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Emission days	:	220
<b>Conditions and measures related to sewage treatment plant</b>		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m <sup>3</sup> /d
<b>Other conditions affecting environmental exposure</b>		
Indoor or outdoor use	:	Indoor use

### 5.2.2. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 5.2.3. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>
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# SAFETY DATA SHEET

**EASTMAN**

according to Regulation (EC) No. 1907/2006

## Probenz(TM) SG Sodium Benzoate, Food Grade, Kosher

Version            Revision Date:            SDS Number:            Date of last issue: 09.08.2018  
3.5                21.02.2020                150000072050            Date of first issue: 21.03.2011  
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Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 5.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use

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Temperature	: <= 40 °C
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### 5.2.5. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 5.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).

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Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 5.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 5.2.8. Control of worker exposure: Roller application or brushing (PROC10)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.

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Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 5.2.9. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

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### 5.3. Exposure estimation and reference to its source

#### 5.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	1.82 kg/day	FEICA SPERC 2.2b.v1
Air	0 kg/day	FEICA SPERC 2.2b.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.016 mg/L (EUSES v2.1)	0.122
Freshwater sediment	0.214 mg/kg dry weight (EUSES v2.1)	0.122
Marine water	0.00157 mg/L (EUSES v2.1)	0.121
Marine sediment	0.021 mg/kg dry weight (EUSES v2.1)	0.121
Sewage treatment plant	0.114 mg/L (EUSES v2.1)	0.011
Soil	0.056 mg/kg dry weight (EUSES v2.1)	0.934
Predator's prey (freshwater)	0.062 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00613 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00396 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.02 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000002 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00584 mg/kg bw/day (EUSES v2.1)	< 0.01

#### 5.3.2. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup>	0.033

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			(ECETOC TRA worker v2.0)	
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.036

### 5.3.3. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 5.3.4. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA	0.036

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			worker v2.0)	
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### 5.3.5. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.047

### 5.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.012
inhalative	local	long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.375
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 5.3.7. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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inhalative	systemic	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.02
inhalative	local	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.6
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.031

### 5.3.8. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v2.0)	0.044
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.077

### 5.3.9. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01



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### ES 6: Formulation & (re)packing of substances and mixtures (GEST2\_I).Use in Powder Coatings.

#### 6.1. Title section

<b>Exposure Scenario name</b>	: Formulation & (re)packing of substances and mixtures, Use in Powder Coatings
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<b>Structured Short Title</b>	: Formulation & (re)packing of substances and mixtures (GEST2_I).Use in Powder Coatings.
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Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed process, no likelihood of exposure	PROC1
CS 3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 4	Use in closed batch process (synthesis or formulation)	PROC3
CS 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9

#### 6.2. Conditions of use affecting exposure

##### 6.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 3.64 tonnes/day
Annual amount per site	: <= 800 tonnes/year
Emission days	: 220
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant

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STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m3/d
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	0.00018 m3/d

### 6.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 6.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	

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Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 6.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

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### 6.2.5. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 6.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation	

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Dermal - minimum efficiency of 0 %	
Inhalation - minimum efficiency of 95 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 6.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).	
Dermal - minimum efficiency of 0 %	
Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation	
Dermal - minimum efficiency of 0 %	
Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 6.3. Exposure estimation and reference to its source

#### 6.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	0.182 kg/day	CEPE SPERC 2.1a.v1
Air	0.353 kg/day	CEPE SPERC 2.1a.v1

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Protection Target	Exposure estimate	RCR
Freshwater	0.00552 mg/L (EUSES v2.1)	0.042
Freshwater sediment	0.075 mg/kg dry weight (EUSES v2.1)	0.042
Marine water	0.000546 mg/L (EUSES v2.1)	0.042
Marine sediment	0.00739 mg/kg dry weight (EUSES v2.1)	0.042
Sewage treatment plant	0.011 mg/L (EUSES v2.1)	< 0.01
Soil	0.033 mg/kg dry weight (EUSES v2.1)	0.553
Predator's prey (freshwater)	0.037 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00396 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00347 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.017 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000591 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.014 mg/kg bw/day (EUSES v2.1)	< 0.01

### 6.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.01
Dermal	systemic	long-term	0.003 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01



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### 6.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 6.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 6.3.5. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup>	0.75

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			(ECETOC TRA worker v2.0)	
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.047

### 6.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.087 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.029
inhalative	local	long-term	0.087 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.875
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.051

### 6.3.7. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.02
inhalative	local	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.6
Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.031

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### 6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 7: Formulation & (re)packing of substances and mixtures (GEST2\_I).Use in coatings (GEST3\_I, GEST3\_P, GEST3\_C).

#### 7.1. Title section

<b>Exposure Scenario name</b>	: Formulation & (re)packing of substances and mixtures, Coatings
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<b>Structured Short Title</b>	: Formulation & (re)packing of substances and mixtures (GEST2_I).Use in coatings (GEST3_I, GEST3_P, GEST3_C).
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Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed process, no likelihood of exposure	PROC1
CS 3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 4	Use in closed batch process (synthesis or formulation)	PROC3
CS 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 8	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9

#### 7.2. Conditions of use affecting exposure

##### 7.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 3.64 tonnes/day
Annual amount per site	: <= 800 tonnes/year
Conditions and measures related to sewage treatment plant	

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STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m3/d
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18,000 m3/d

### 7.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 7.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid

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<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 7.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

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### 7.2.5. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 7.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation	

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Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 7.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 7.2.8. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)





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Soil	0.033 mg/kg dry weight (EUSES v2.1)	0.553
Predator's prey (freshwater)	0.037 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00396 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00347 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.017 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000591 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.014 mg/kg bw/day (EUSES v2.1)	< 0.01

### 7.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.01
Dermal	systemic	long-term	0.003 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 7.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1

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Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 7.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.01 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.1
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 7.3.5. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.047

### 7.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.15
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.027

### 7.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.012
inhalative	local	long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.375
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 7.3.8. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.02
inhalative	local	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.6

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Dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v2.0)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.031

### 7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

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### ES 8: Formulation & (re)packing of substances and mixtures (GEST2\_I).

#### 8.1. Title section

**Exposure Scenario name** : Formulation & (re)packing of substances and mixtures

**Structured Short Title** : Formulation & (re)packing of substances and mixtures (GEST2\_I).

Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed process, no likelihood of exposure	PROC1
CS 3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 4	Use in closed batch process (synthesis or formulation)	PROC3
CS 5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 6	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 7	Calendering operations	PROC6
CS 8	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 9	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 10	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 11	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14
CS 12	Use as laboratory reagent	PROC15

#### 8.2. Conditions of use affecting exposure

##### 8.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure

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Daily amount per site	:	<= 0.92 tonnes/day
Annual amount per site	:	<= 275 tonnes/year
Emission days	:	300
<b>Conditions and measures related to sewage treatment plant</b>		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	:	2,000 m3/d
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18,000 m3/d

### 8.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

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<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	



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Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Respirator with a half face mask Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 8.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics
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Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.2.7. Control of worker exposure: Calendering operations (PROC6)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use

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Temperature	: <= 40 °C
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### 8.2.8. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 25 °C

### 8.2.9. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>

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Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.2.10. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 70 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use

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Temperature	: <= 40 °C
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### 8.2.11. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use
Temperature : <= 40 °C

### 8.2.12. Control of worker exposure: Use as laboratory reagent (PROC15)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.
Physical form of product : liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 %

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Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 8.3. Exposure estimation and reference to its source

#### 8.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	1.84 kg/day	Estimated release factor
Air	0.046 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Freshwater	0.016 mg/L (EUSES v2.1)	0.122
Freshwater sediment	0.216 mg/kg dry weight (EUSES v2.1)	0.123
Marine water	0.0015 mg/L (EUSES v2.1)	0.122
Marine sediment	0.021 mg/kg dry weight (EUSES v2.1)	0.122
Sewage treatment plant	0.115 mg/L (EUSES v2.1)	0.012
Soil	0.056 mg/kg dry weight (EUSES v2.1)	0.939
Predator's prey (freshwater)	0.072 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00715 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00416 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.02 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000105 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00746 mg/kg bw/day (EUSES v2.1)	< 0.01

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	v2.1)	
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### 8.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.01
Dermal	systemic	long-term	0.003 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 8.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.023
inhalative	local	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.7
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.026

### 8.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA	0.033

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			worker v2.0)	
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 8.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.017 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.017 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.175
Dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	< 0.01

### 8.3.6. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA	0.047



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			worker v2.0)	
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### 8.3.7. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.025
inhalative	local	long-term	0.075 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.75
Dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v2.0)	0.044
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.069

### 8.3.8. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	0.015 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.15
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.027

### 8.3.9. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.037 mg/m <sup>3</sup>	0.012

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			(ECETOC TRA worker v2.0)	
inhalative	local	long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.375
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v2.0)	0.022
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.034

### 8.3.10. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.02
inhalative	local	long-term	0.06 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.6
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA worker v2.0)	0.11
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.13

### 8.3.11. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.033
inhalative	local	long-term	0.1 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	1
Dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01

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combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.039
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### 8.3.12. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.035 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.012
inhalative	local	long-term	0.035 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.35
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.012

### 8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Not applicable

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### ES 9: Industrial use. Use in Adhesive and Surface Treatment Products.

#### 9.1. Title section

<b>Exposure Scenario name</b>	: Industrial use, Use in Adhesive and Surface Treatment Products
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<b>Structured Short Title</b>	: Industrial use. Use in Adhesive and Surface Treatment Products.
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Environment		
CS 1	Industrial use of processing aids in processes and products, not becoming part of articles	ERC4
CS 2	Industrial use resulting in inclusion into or onto a matrix	ERC5
Worker		
CS 3	Industrial spraying	PROC7
CS 4	Hand-mixing with intimate contact and only PPE available	PROC19

#### 9.2. Conditions of use affecting exposure

##### 9.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0.6 tonnes/day
Annual amount per site	: <= 60 tonnes/year
Emission days	: 220 days/year
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
STP sludge treatment	: Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	: 2,000 m <sup>3</sup> /d

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### 9.2.2. Control of environmental exposure: Industrial use resulting in inclusion into or onto a matrix (ERC5)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 4.5 tonnes/day
Annual amount per site	: <= 1000 tonnes/year
Emission days	: 220 days/year
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
STP sludge treatment	: Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
STP effluent	: 2,000 m3/d

### 9.2.3. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	

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Indoor or outdoor use	:	Indoor use
Temperature	:	<= 40 °C

### 9.2.4. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: liquid
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: <= 40 °C

### 9.3. Exposure estimation and reference to its source

#### 9.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Release route	Release rate	Release estimation method
Water	0 kg/day	FEICA SPERC 2.1a.v1
Air	591 kg/day	FEICA SPERC 2.1a.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.0043 mg/L (EUSES v2.1)	0.034

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Freshwater sediment	0.059 mg/kg dry weight (EUSES v2.1)	0.034
Marine water	0.0043 mg/L (EUSES v2.1)	0.033
Marine sediment	0.0058 mg/kg dry weight (EUSES v2.1)	0.033
Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Soil	0.043 mg/kg dry weight (EUSES v2.1)	0.725
Predator's prey (freshwater)	0.035 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00341 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00341 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.022 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Oral	0.045 mg/m <sup>3</sup> (EUSES v2.1)	0.03
Man via environment - Inhalation	6.762 mg/kg bw/day (EUSES v2.1)	0.407

### 9.3.2. Environmental release and exposure: Industrial use resulting in inclusion into or onto a matrix (ERC5)

Release route	Release rate	Release estimation method
Water	0 kg/day	FEICA SPERC 5.1a.v1
Air	76.5 kg/day	FEICA SPERC 5.1a.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.0043 mg/L (EUSES v2.1)	0.034
Freshwater sediment	0.059 mg/kg dry weight (EUSES v2.1)	0.034
Marine water	0.00043 mg/L (EUSES v2.1)	0.033
Marine sediment	0.0058 mg/kg dry weight (EUSES v2.1)	0.033
Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Soil	0.034 mg/kg dry weight (EUSES v2.1)	0.572

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Predator's prey (freshwater)	0.035 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00341 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00341 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.018 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.013 mg/m <sup>3</sup> (EUSES v2.1)	0.117
Man via environment - Oral	1.948 mg/kg bw/day (EUSES v2.1)	0.126

### 9.3.3. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.017
inhalative	local	long-term	0.05 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	0.5
Dermal	systemic	long-term	4.286 mg/kg bw/day (ECETOC TRA worker v2.0)	0.069
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.085

### 9.3.4. Worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	< 0.002 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
inhalative	local	long-term	< 0.002 mg/m <sup>3</sup> (ECETOC TRA worker v2.0)	< 0.01
Dermal	systemic	long-term	14.14 mg/kg bw/day (ECETOC TRA worker v2.0)	0.226



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combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	0.226
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### 9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 10: Consumer use.Cosmetics, personal care products (PC39).

#### 10.1. Title section

**Exposure Scenario name**                                :    Consumer use, Cosmetics, personal care products

**Structured Short Title**                                    :    Consumer use.Cosmetics, personal care products (PC39).

Environment		
<b>CS 1</b>	<b>Wide dispersive indoor use of processing aids in open systems</b>	ERC8a
Consumer		
<b>CS 2</b>	Cosmetics, personal care products	PC39

#### 10.2. Conditions of use affecting exposure

##### 10.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	:    <= 0.001 tonnes/day

##### 10.2.2. Control of consumer exposure: Cosmetics, personal care products (PC39)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	:    solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	:    Exposure time 1 h
Other conditions affecting consumers exposure	
Body parts exposed	:    Whole body
Indoor or outdoor use	:    Indoor use

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### 10.3. Exposure estimation and reference to its source

#### 10.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Release route	Release rate	Release estimation method
Water	1.09 kg/day	Estimated release factor
Air	0 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Freshwater	0.011 mg/L (EUSES v2.1)	0.086
Freshwater sediment	0.152 mg/kg dry weight (EUSES v2.1)	0.086
Marine water	0.0012 mg/L (EUSES v2.1)	0.086
Marine sediment	0.015 mg/kg dry weight (EUSES v2.1)	0.086
Sewage treatment plant	0.068 mg/L (EUSES v2.1)	< 0.01
Soil	0.046 mg/kg dry weight (EUSES v2.1)	0.764
Predator's prey (freshwater)	0.062 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00612 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.00395 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.019 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000002 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00536 mg/kg bw/day (EUSES v2.1)	< 0.01

#### 10.3.2. Consumer exposure: Cosmetics, personal care products (PC39)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	(ECETOC TRA	

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			worker v2.0)	
inhalative	local	long-term	(ECETOC TRA worker v2.0)	
Dermal	systemic	long-term	29.16 mg/kg bw/day (ECETOC TRA worker v2.0)	0.933
oral	systemic	long-term	0 mg/kg bw/day (ECETOC TRA worker v2.0)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v2.0)	

### 10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Not applicable

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### ES 11: Professional use.Hairdressing and other professional cosmetic services.

#### 11.1. Title section

<b>Exposure Scenario name</b>	:	Professional use, Hairdressing and other professional cosmetic services
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<b>Structured Short Title</b>	:	Professional use.Hairdressing and other professional cosmetic services.
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Environment		
CS 1	Wide dispersive indoor use of processing aids in open systems	ERC8a
CS 2	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)	ERC8a

#### 11.2. Conditions of use affecting exposure

##### 11.2.1. Control of environmental exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0.00825 tonnes/day
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Prevent environmental discharge consistent with regulatory requirements.	

##### 11.2.2. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0.00825 tonnes/day

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Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Prevent environmental discharge consistent with regulatory requirements.	

### 11.3. Exposure estimation and reference to its source

#### 11.3.1. Environmental release and exposure: Wide dispersive indoor use of processing aids in open systems (ERC8a)

Release route	Release rate	Release estimation method
Water	0.083 kg/day	EFCC SPERC 8A.1a.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.00159 mg/L (EUSES v2.1)	0.012
Freshwater sediment	0.021 mg/kg dry weight (EUSES v2.1)	0.012
Marine water	0.00015 mg/L (EUSES v2.1)	0.012
Marine sediment	0.00204 mg/kg dry weight (EUSES v2.1)	0.012
Sewage treatment plant	0.00518 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00115 mg/kg dry weight (EUSES v2.1)	0.019
Predator's prey (freshwater)	0.01 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.000984 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.000821 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.00016 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000115 mg/kg bw/day (EUSES v2.1)	< 0.01

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### 11.3.2. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Release route	Release rate	Release estimation method
Water	0.083 kg/day	CEPE SPERC 8a.n.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.00159 mg/L (EUSES v2.1)	0.012
Freshwater sediment	0.021 mg/kg dry weight (EUSES v2.1)	0.012
Marine water	0.00015 mg/L (EUSES v2.1)	0.012
Marine sediment	0.00204 mg/kg dry weight (EUSES v2.1)	0.012
Sewage treatment plant	0.00518 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00115 mg/kg dry weight (EUSES v2.1)	0.019
Predator's prey (freshwater)	0.01 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.000984 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.000821 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.00016 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000115 mg/kg bw/day (EUSES v2.1)	< 0.01

### 11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.

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### ES 12: Professional use.Washing and cleaning products (PC35).Biocidal products (PC8).Polishes and wax blends (PC31).

#### 12.1. Title section

<b>Exposure Scenario name</b>	: Professional use, AISE : Washing, cleaning and disinfecting products,polishes and waxes blends
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<b>Structured Short Title</b>	: Professional use.Washing and cleaning products (PC35).Biocidal products (PC8).Polishes and wax blends (PC31).
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Environment		
CS 1	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)	ERC8a
Worker		
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS 3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 4	Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	PROC8a
CS 5	Roller application or brushing	PROC10
CS 6	Treatment of articles by dipping and pouring	PROC13

#### 12.2. Conditions of use affecting exposure

##### 12.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0.00165 tonnes/day
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant



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STP sludge treatment	:	Sludge from municipal sewage treatment plant assumed to be spread to agricultural land.
<b>Conditions and measures related to treatment of waste (including article waste)</b>		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>		
Prevent environmental discharge consistent with regulatory requirements.		

### 12.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, very high dustiness
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 12.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

<b>Product (article) characteristics</b>
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Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, very high dustiness
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 80 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 12.2.4. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, very high dustiness
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Exposure time <= 1 h
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation	

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Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 80 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

### 12.2.5. Control of worker exposure: Roller application or brushing (PROC10)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : Solid, very high dustiness
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 80 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor
Temperature : <= 40 °C

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### 12.2.6. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, very high dustiness
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: Exposure time <= 4 h
<b>Technical and organisational conditions and measures</b>	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 80 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Respirator with a half face mask Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: <= 40 °C

### 12.3. Exposure estimation and reference to its source

#### 12.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Release route	Release rate	Release estimation method
Water	1.65 kg/day	AISE SPERC 8a.1.a.v1
Air	0 kg/day	AISE SPERC 8a.1.a.v1

Protection Target	Exposure estimate	RCR
Freshwater	0.011 mg/L (EUSES v2.1)	0.088

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Freshwater sediment	0.155 mg/kg dry weight (EUSES v2.1)	0.088
Marine water	0.0013 mg/L (EUSES v2.1)	0.087
Marine sediment	0.015 mg/kg dry weight (EUSES v2.1)	0.087
Sewage treatment plant	0.104 mg/L (EUSES v2.1)	0.01
Agricultural soil	0.023 mg/kg dry weight (EUSES v2.1)	0.384
Predator's prey (freshwater)	0.049 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (marine water)	0.00487 mg/kg wet weight (EUSES v2.1)	< 0.01
Top predator's prey (marine water)	0.0016 mg/kg wet weight (EUSES v2.1)	< 0.01
Predator's prey (terrestrial)	0.00309 mg/kg wet weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00146 mg/kg bw/day (EUSES v2.1)	< 0.01

### 12.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
inhalative	local	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.024

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### 12.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.035 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.012
inhalative	local	long-term	0.035 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.011
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.023

### 12.3.4. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
inhalative	local	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA worker v3)	0.219
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.243

### 12.3.5. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023

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inhalative	local	long-term	0.07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
Dermal	systemic	long-term	27.43 mg/kg bw/day (ECETOC TRA worker v3)	0.439
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.462

### 12.3.6. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0.021 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalative	local	long-term	0.021 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.21
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA worker v3)	0.219
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.226

### 12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Further details on scaling and control technologies are provided in SPERC factsheet.