

The United Kingdom (UK) has left the European Union (EU) officially on 31/01/2020, however the classification and labelling regime is still based on the existing EU regulatory regime during a transition period to provide continuity for businesses. Therefore this document is still aligned on EU standards to ensure the safe use of the substance. It will be updated as the UK publishes new classification and labelling regulation diverging from the legal framework currently applied.

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

### 1.1 Product identifier

- |                 |  |
|-----------------|--|
| - Trade name    | AUGEO® CRYSTAL   |
| - Chemical name | Racemic mixture (+/-)-2,2-dimethyl-4-hydroxymethyl-1,3-dioxolane |
| - CAS-No.       | 100-79-8   |

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

#### Uses of the Substance/Mixture

- Cleaning agent
- Waxes
- Stain removers and waxes removers
- Glass cleaner
- diluent and vehicle for fragrances

#### Remarks

- For professional and industrial installation and use only.

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

#### Company

Craftovator Ltd  
Fleetwood House  
1 Albion Close  
Slough  
SL2 5DT

#### E-mail address

info@craftovator.co.uk

## SECTION 2: Hazards identification

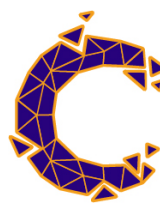
### 2.1 Classification of the substance or mixture

#### Classification (Regulation (EC) No 1272/2008 )

Eye irritation, Category 2

H319: Causes serious eye irritation.

### 2.2 Label elements



**GB Harmonized System of Classification and Labelling of Chemicals (GB CLP)**

**Pictogram**



**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 which do not result in classification**

**Results of PBT and vPvB assessment**

- Substance is not persistent, bioaccumulative, and toxic (PBT).
- Substance is not very persistent and very bioaccumulative (vPvB).

**SECTION 3: Composition/information on ingredients**

**3.1 Substance**

- Chemical name Racemic mixture (+/-)-2,2-dimethyl-4-hydroxymethyl-1,3-dioxolane
- Synonyms (+/-)-2,2-dimethyl-1,3-dioxolane-4-methanol, Isopropylidene glycerol
- Formula C<sub>6</sub>H<sub>12</sub>O<sub>3</sub>

**Information on Components and Impurities**

Chemical name	Identification number	Classification Regulation (EC) No 1272/2008	Concentration [%]
2,2-dimethyl-1,3-dioxolan-4-ylmethanol	CAS-No. : 100-79-8 EINECS-No. : 202-888-7	Eye irritation, Category 2 ; H319	>= 99 - <= 100

For the full text of the H-Statements mentioned in this Section, see Section 16.

**3.2 Mixture**

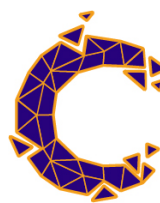
- Not applicable, this product is a substance.

**SECTION 4: First aid measures**

**4.1 Description of first aid measures**

**General advice**

- First aider needs to protect himself.
- Show this safety data sheet to the doctor in attendance.
- Place affected clothing in a sealed bag for subsequent decontamination.
- When symptoms persist or in all cases of doubt seek medical advice.



#### **In case of inhalation**

- Quickly move the person away from the contaminated area. Make the affected person rest.
- Obtain medical attention.
- Show this sheet to the doctor.
- Be prepared to provide first aid or medical support if necessary.

#### **In case of skin contact**

- Wash off immediately with plenty of water for at least 15 minutes.
- Use appropriate protective equipment when treating a contaminated person.
- In case of inflammation (redness, irritation, ...) obtain medical attention.
- Show this sheet to the doctor.
- Be prepared to provide first aid or medical support if necessary.

#### **In case of eye contact**

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Keep eye wide open while rinsing.
- Show this sheet to the doctor.
- Always obtain medical advice, even if there are no symptoms.
- Be prepared to provide first aid or medical support if necessary.

#### **In case of ingestion**

- Do NOT induce vomiting.
- Obtain medical attention.
- Show this sheet to the doctor.
- Do not give anything to drink.
- Be prepared to provide first aid or medical support if necessary.

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

#### **Effects**

- Chronic exposure may cause dermatitis.
- May cause irreversible eye damage.
- Loss of the eye

#### **Symptoms**

- Redness
- Swelling of tissue
- Causes skin burns.
- Lachrymation
- Conjunctivitis
- Causes eye burns.

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

#### **Notes to physician**

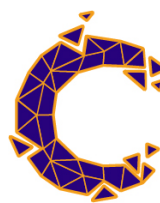
- Burns must be treated by a physician.
- Contact a poison control center.

## **SECTION 5: Firefighting measures**

### **5.1 Extinguishing media**

#### **Suitable extinguishing media**

- Extinguishing media - small fires
- Water spray
- Multi-purpose powders
- Carbon dioxide (CO<sub>2</sub>)
- Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)
  
- Extinguishing media - large fires



- Water spray
- Multi-purpose powders
- Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF)
  
- Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable extinguishing media**

- Do not use a solid water stream as it may scatter and spread fire.
- High volume water jet

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

**Specific hazards during firefighting**

- Combustible liquid.
- The pressure in sealed containers can increase under the influence of heat.
- Hazardous decomposition products formed under fire conditions.
- High concentrations of toxic or harmful products may remain in the residual liquid once the fire has been extinguished.
  
- Under fire conditions:
  - Will burn
  - On combustion, toxic gases are released.

**Hazardous combustion products:**

- Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

**5.3 Advice for firefighters**

**Special protective equipment for firefighters**

- Wear full protective clothing and self-contained breathing apparatus.
- Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing
- In the event of fire, wear self-contained breathing apparatus.
- For further information refer to section 8 "Exposure controls/personal protection".

**Specific fire fighting methods**

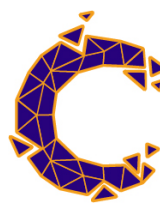
- Stay upwind.
- Fight fire with normal precautions from a reasonable distance.
  
- Do not use a solid water stream as it may scatter and spread fire.
- Cool down the containers/equipment exposed to heat with a water spray. Ensure that there is NO direct contact between the water and the product.
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Further information**

- Evacuate personnel to safe areas.
  
- Intervention only by capable personnel who are trained and aware of the hazards of the product.
- Never approach containers which have been exposed to fire, without cooling them sufficiently.
  
- Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
- Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

**SECTION 6: Accidental release measures**

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



- Avoid inhalation, ingestion and contact with skin and eyes.
- Wear chemical resistant personal protective equipment
- Wear suitable gloves.
- Wear suitable protective clothing.
  
- Wear as appropriate:
  - Face-shield
  - Tightly fitting safety goggles
  
- In the case of dust or aerosol formation use respirator with an approved filter.
- In the case of vapour formation use a respirator with an approved filter.
  
- Eliminate all ignition sources if safe to do so.
  
- Stop leak if safe to do so.
  
- For further information refer to section 8 "Exposure controls/personal protection".

## 6.2 Environmental precautions

- Take all necessary measures to avoid accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems.
  
- Prevent further leakage or spillage if safe to do so.
- Contain the spilled material by bunding.
- The product should not be allowed to enter drains, water courses or the soil.

## 6.3 Methods and materials for containment and cleaning up

- No sparking tools should be used.
  
- Stop leak if safe to do so.
- Dam up with sand or inert earth (do not use combustible materials).
  
- Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder).
- Shovel or sweep up.
- Keep in suitable, closed containers for disposal.
- Never return spills in original containers for re-use.
  
- Wash non-recoverable remainder with large amounts of water.
- Clean contaminated surface thoroughly.
- Recover the cleaning water for subsequent disposal.
- Decontaminate tools, equipment and personal protective equipment in a segregated area.
  
- Dispose of in accordance with local regulations.

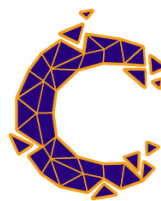
## 6.4 Reference to other sections

- 7. HANDLING AND STORAGE
- 8. EXPOSURE CONTROLS/PERSONAL PROTECTION
- 13. DISPOSAL CONSIDERATIONS

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

- Handle in accordance with good industrial hygiene and safety practice.
  
- Wear personal protective equipment.
- Wear suitable protective clothing.
  
- Avoid inhalation, ingestion and contact with skin and eyes.



- Avoid splashes.
- Avoid formation of aerosol.
- For personal protection see section 8.
- Containers must be bonded and grounded when pouring or transferring material.
- This material contains a flammable or combustible liquid and vapor.

#### **Hygiene measures**

- Handle in accordance with good industrial hygiene and safety practice.
- Use clean, well-maintained personal protection equipment.
- Regular cleaning of equipment, work area and clothing.
- When using do not eat, drink or smoke.
- Smoking, eating and drinking should be prohibited in the application area.
- Wash hands before breaks and immediately after handling the product.
- Contaminated work clothing should not be allowed out of the workplace.
- The user is responsible for monitoring the working environment in accordance with local laws and regulations.

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

#### **Technical measures/Storage conditions**

- Take all necessary measures to avoid accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems.
- Keep locked up or in an area accessible only to qualified or authorised persons.
- Keep containers tightly closed in a dry, cool and well-ventilated place.
- Keep away from open flames, hot surfaces and sources of ignition.
- Keep away from incompatible materials to be indicated by the manufacturer
- Observe the general rules of industrial fire protection.
- Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material's flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed. In the Americas, National Fire Protection Association (NFPA) 30: Flammable and Combustible Liquids Code, is a widely used standard. NFPA 30 establishes storage conditions for the following classes of materials: Class I Flammable Liquids, Flashpoint <37.8 °C. Class II Combustible Liquids, 37.8 °C < Flashpoint <60 °C. Class IIIa Combustible Liquids, 60 °C < Flashpoint < 93 °C. Class IIIb Combustible Liquids, Flashpoint > 93 °C.
- Keep away from sources of ignition - No smoking.

#### **Packaging material**

##### **Suitable material**

- Unlined steel
- Plastic container of HDPE

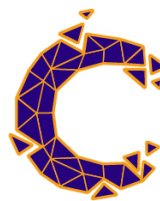
### **7.3 Specific end use(s)**

- no data available

## **SECTION 8: Exposure controls/personal protection**

### **8.1 Control parameters**

- Contains no substances with occupational exposure limit values above their regulatory reporting threshold.



## 8.2 Exposure controls

### Control measures

#### Engineering measures

- Effective exhaust ventilation system
- Ensure adequate ventilation.
  
- Extract at emission point.
- Ensure that extracted air cannot be returned to the workplace through the ventilation system.
  
- Avoid splashes.
- Avoid formation of aerosol.

### Individual protection measures

#### Respiratory protection

- This should be achieved by a good general extraction and -if practically feasible- by the use of a local exhaust ventilation.
- Use a respirator with an approved filter if a risk assessment indicates this is necessary.
- Keep in a well-ventilated place.

#### Hand protection

- Where there is a risk of contact with hands, use appropriate gloves
- Gloves must be inspected prior to use.
- Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
- Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
  
- The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

#### Eye protection

- Tightly fitting safety goggles
- Face-shield

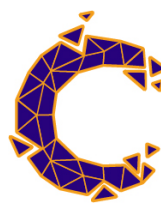
#### Skin and body protection

- Full protective suit
- Footwear protecting against chemicals
  
- Choose body protection according to the amount and concentration of the dangerous substance at the work place.
  
- Impervious clothing
- Change working clothes after each workshift.
- Contaminated work clothing should not be allowed out of the workplace.

#### Hygiene measures

- Handle in accordance with good industrial hygiene and safety practice.
- Use clean, well-maintained personal protection equipment.
- Regular cleaning of equipment, work area and clothing.
- When using do not eat, drink or smoke.
- Smoking, eating and drinking should be prohibited in the application area.
- Wash hands before breaks and immediately after handling the product.
- Contaminated work clothing should not be allowed out of the workplace.
  
- The user is responsible for monitoring the working environment in accordance with local laws and regulations.

### Protective measures



- Emergency equipment immediately accessible, with instructions for use.
- Ensure that eyewash stations and safety showers are close to the workstation location.
- Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the potential hazards and/or risks that may occur during use.
- The protective equipment must be selected in accordance with current CEN standards and in cooperation with the supplier of the protective equipment.

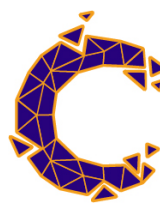
#### **Environmental exposure controls**

- Take all necessary measures to avoid accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems.
- Prevent further leakage or spillage if safe to do so.
- Contain the spilled material by bunding.
- The product should not be allowed to enter drains, water courses or the soil.
- Dispose of rinse water in accordance with local and national regulations.

### **SECTION 9: Physical and chemical properties**

#### **9.1 Information on basic physical and chemical properties**

<b><u>Physical state</u></b>	liquid
<b><u>Colour</u></b>	colourless
<b><u>Odour</u></b>	slight
<b><u>Odour Threshold</u></b>	No data available
<b><u>Melting point/freezing point</u></b>	<u>Freezing point:</u> -99 °C
<b><u>Initial boiling point and boiling range</u></b>	<u>Boiling point/boiling range:</u> 183 - 191 °C ( 1,013.25 hPa)
<b><u>Flammability (solid, gas)</u></b>	No data available
<b><u>Flammability (liquids)</u></b>	No data available
<b><u>Flammability/Explosive limit</u></b>	No data available
<b><u>Flash point</u></b>	91 °C closed cup 100 °C open cup
<b><u>Auto-ignition temperature</u></b>	No data available
<b><u>Decomposition temperature</u></b>	No data available
<b><u>pH</u></b>	Not applicable
<b><u>Viscosity</u></b>	<u>Viscosity, dynamic :</u> 11 mPa.s ( 20 °C)
<b><u>Solubility</u></b>	<u>Water solubility:</u> ( 20 °C)completely soluble  <u>Solubility in other solvents:</u> Alcohol: miscible  Esters: miscible  Ether: miscible





	Aromatic hydrocarbons: miscible
	petroleum ether.: miscible
	petrol: miscible
<b><u>Partition coefficient: n-octanol/water</u></b>	No data available
<b><u>Vapour pressure</u></b>	0.05 hPa ( 20 °C)
<b><u>Density</u></b>	1.0670 g/cm <sup>3</sup> ( 20 °C)
<b><u>Relative density</u></b>	1.069 ( 20 °C)
<b><u>Relative vapor density</u></b>	2.6
<b><u>Particle characteristics</u></b>	No data available
<b><u>Evaporation rate (Butylacetate = 1)</u></b>	0.027
<b>9.2 Other information</b>	
<b><u>Self-ignition</u></b>	390 °C ( 1,013 hPa) Method: EU Test Guideline A15
<b><u>Surface tension</u></b>	33.5 mN/m ( 20 °C)
<b><u>Molecular weight</u></b>	132.16 g/mol

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

- Stable at normal ambient temperature and pressure.

### 10.2 Chemical stability

- Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

- No dangerous reaction known under conditions of normal use.

### 10.4 Conditions to avoid

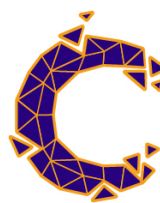
- Keep away from open flames, hot surfaces and sources of ignition.
- Avoid high temperatures.
- Avoid excessive heat for prolonged periods of time.

### 10.5 Incompatible materials

- Strong oxidizing agents
- Strong acids
- On contact with acid releases:
- Acetone

### 10.6 Hazardous decomposition products

- On combustion or on thermal decomposition (pyrolysis) releases:
- Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).



## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

**Acute oral toxicity** Not classified as hazardous for acute oral toxicity according to GHS.  
Based on data from similar materials

**Acute inhalation toxicity** Not classified as hazardous for acute inhalation toxicity according to GHS.  
Based on data from similar materials

**Acute dermal toxicity** Not classified as hazardous for acute dermal toxicity according to GHS.  
Based on data from similar materials

**Acute toxicity (other routes of administration)** No data available

**Skin corrosion/irritation** Not classified as irritating to skin  
Based on data from similar materials

**Serious eye damage/eye irritation** Irritating to eyes.  
Based on data from similar materials

**Respiratory or skin sensitisation** Does not cause skin sensitisation.  
Based on data from similar materials

#### Mutagenicity

**Genotoxicity in vitro** Product is not considered to be genotoxic  
Based on data from similar materials

**Genotoxicity in vivo** Product is not considered to be genotoxic  
Based on data from similar materials

**Carcinogenicity** The product is not considered to be carcinogenic.  
Based on data from similar materials

#### Toxicity for reproduction and development

**Toxicity to reproduction/Fertility** The product is not considered to affect fertility., Based on data from similar materials

**Developmental Toxicity/Teratogenicity** The product is not considered to be toxic for development., The product is not considered to be teratogenic., Based on data from similar materials

#### STOT

**STOT - single exposure** The substance or mixture is not classified as specific target organ toxicant, single exposure according to GHS criteria.  
Based on data from similar materials

**STOT - repeated exposure** The substance or mixture is not classified as specific target organ toxicant, repeated exposure according to GHS criteria.  
Based on data from similar materials

No data is available on the product itself.

**Experience with human exposure** No data available

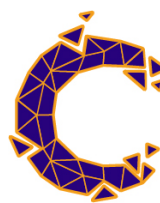
**Aspiration toxicity** No aspiration toxicity classification

## SECTION 12: Ecological information

### 12.1 Toxicity

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### Aquatic Compartment

Acute toxicity to fish	The product itself has not been tested.
Acute toxicity to daphnia and other aquatic invertebrates	The product itself has not been tested.
Toxicity to aquatic plants	The product itself has not been tested.
Toxicity to microorganisms	The product itself has not been tested.
Chronic toxicity to fish	The product itself has not been tested.
Chronic toxicity to daphnia and other aquatic invertebrates	The product itself has not been tested.

### Sediment compartment

Toxicity to benthic organisms	The product itself has not been tested.
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### Terrestrial Compartment

Toxicity to soil dwelling organisms	The product itself has not been tested.
Toxicity to terrestrial plants	The product itself has not been tested.
Toxicity to above ground organisms	The product itself has not been tested.

## 12.2 Persistence and degradability

### Abiotic degradation

#### Stability in water

2,2-dimethyl-1,3-dioxolan-4-ylmethanol

DT50:  
Hydrolysis  
pH: 4.0

Temperature of hydrolysis: 15 °C  
Hydrolysis time: 6.59 Days

Temperature of hydrolysis: 20 °C  
Hydrolysis time: 3.51 Days

Temperature of hydrolysis: 25 °C  
Hydrolysis time: 0.959 Days

Method: OECD Test Guideline 111  
Unpublished reports

### Physical- and photo-chemical elimination

No data available

### Biodegradation

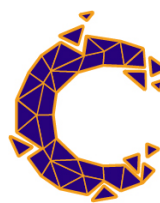
#### Biodegradability

2,2-dimethyl-1,3-dioxolan-4-ylmethanol

Ready biodegradability study:  
Method: OECD Test Guideline 301 D  
4 % - 28 Days

The substance does not fulfill the criteria for ready biodegradability and ultimate aerobic biodegradability

Theoretical oxygen demand  
Inoculum: activated sludge  
Unpublished reports



Inherent biodegradability study  
Method: OECD Test Guideline 302 B  
25 % - 28 Days  
The substance fulfills the criteria for inherent primary biodegradability  
Dissolved organic carbon (DOC)  
Inoculum: activated sludge  
Unpublished internal reports

#### Degradability assessment

The product is not considered to be rapidly degradable in the environment

#### 12.3 Bioaccumulative potential

##### **Partition coefficient: n-octanol/water**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

##### **Bioconcentration factor (BCF)**

No data available

#### 12.4 Mobility in soil

##### **Adsorption potential (Koc)**

Adsorption/Soil  
Log Koc: < 1.25  
Method: OECD Test Guideline 121  
Highly mobile in soils  
Unpublished reports

##### **Known distribution to environmental compartments**

No data available

#### 12.5 Results of PBT and vPvB assessment

Substance is not persistent, bioaccumulative, and toxic (PBT).  
Substance is not very persistent and very bioaccumulative (vPvB).

#### 12.6 Other adverse effects

##### **Ecotoxicity assessment**

##### **Short-term (acute) aquatic hazard**

No acute environmental hazard identified  
Information given is based on data obtained from similar substances.

##### **Long-term (chronic) aquatic hazard**

No chronic environmental hazard identified.  
Information given is based on data obtained from similar substances.

### **SECTION 13: Disposal considerations**

#### 13.1 Waste treatment methods

##### **Product Disposal**

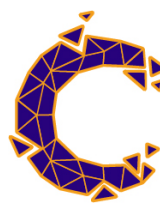
###### ***Prohibition***

- Do not discharge directly into the environment.
- Dispose of in accordance with local regulations.
- The Company encourages the recycle, recovery and reuse of materials, where permitted. If disposal is necessary, The Company recommends that organic materials, especially when classified as hazardous waste, be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed.

##### **Advice on cleaning and disposal of packaging**

###### ***Prohibition***

- Do NOT dispose of untreated packaging with industrial waste.
- Do not dispose of with domestic refuse.
- Empty remaining contents.



- Clean using steam.
- Monitor the residual vapours.
- Dispose of rinse water in accordance with local and national regulations.
  
- Containers that cannot be cleaned must be treated as waste.
  
- Dispose of contents/ container to an approved waste disposal plant.
- Dispose of in accordance with local regulations.
  
- Where possible recycling is preferred to disposal or incineration.
- The recycled material must be completely dry and free of pollutants.

## SECTION 14: Transport information

**ADN/ADNR**  
not regulated

**ADR**  
not regulated

**RID**  
not regulated

**IMDG**  
not regulated

**IATA**  
not regulated

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transport regulations for hazardous materials, it would be advisable to check their validity with your sales office.

## SECTION 15: Regulatory information

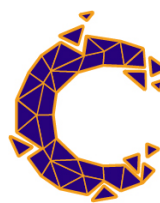
### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

#### Notification status

Inventory Information	Status
United States TSCA Inventory	- All substances listed as active on the TSCA inventory
Canadian Domestic Substances List (DSL)	- Listed on Inventory
Australian Inventory of Industrial Chemicals (AIIC)	- Listed on Inventory
Japan. CSCL - Inventory of Existing and New Chemical Substances	- Listed on Inventory
Korea. Korean Existing Chemicals Inventory (KECI)	- Listed on Inventory
China. Inventory of Existing Chemical Substances in China (IECSC)	- Listed on Inventory
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	- Listed on Inventory
Taiwan Chemical Substance Inventory (TCSI)	- Listed on Inventory
New Zealand. Inventory of Chemical Substances	- All components are listed on the NZIoC inventory. Additional HSNO obligations may apply. Please refer to Section 15 of SDS for New Zealand.

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EU. European Registration, Evaluation, Authorization and Restriction of Chemical (REACH)	- When purchased from a Solvay legal entity based in the EEA ("European Economic Area"), this product is compliant with the registration provisions of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, and/or registered. When purchased from a legal entity outside of the EEA, please contact your local representative for additional information.
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## 15.2 Chemical safety assessment

- no data available

## SECTION 16: Other information

### Full text of H-Statements referred to under sections 2 and 3.

- H319: Causes serious eye irritation.

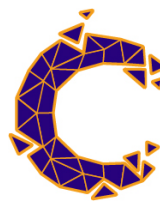
### Key or legend to abbreviations and acronyms used in the safety data sheet

- ADR: European Agreement on International Carriage of Dangerous Goods by Road.
- ADN: European Agreement on the International Carriage of Dangerous Goods by Inland Waterways.
- RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.
- IATA: International Air Transport Association.
- ICAO-TI: Technical Instructions for Safe Transport of Dangerous Goods by Air.
- IMDG: International Maritime Dangerous Goods.
- TWA: Time weighted average
- ATE: Estimated value of acute toxicity
- EC: European Community number
- CAS: Chemical Abstracts Service.
- LD50: Substance that causes 50% (half) death in the test animals group (Median Fatal Dose).
- LC50: Substance concentration causing 50% (half) death in the test animals group.
- EC50: Effective Concentration of the substance causing the maximum of 50%.
- PBT: Persistent, Bioaccumulative and Toxic substance.
- vPvB: Very Persistent and Very Bioaccumulative.
- GHS/CLP/SEA: Classification, labeling, packaging regulation
- DNEL: Derived No Effect Level
- PNEC: Predicted No Effect Concentration
- STOT: Specific Target Organ Toxicity

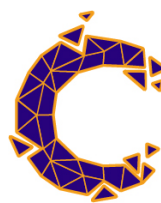
**Not all acronyms listed above are referenced in this SDS.**

### Further information

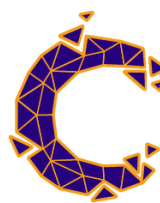
- Distribute new edition to clients
- Update
- See section 2



The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in any other manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.



Annex  
: 407





**ES1: Formulation or re-packing, Formulation of biocidal products**

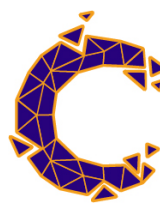
**1.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing	
<b>Environment</b>		
<b>CS1</b>	<b>Formulation of biocidal products</b>	ERC2,,
<b>Worker</b>		
<b>CS2</b>	<b>Reception raw material from bulk</b>	PROC8b,
<b>CS3</b>	<b>Reception raw material from package</b>	PROC3,
<b>CS4</b>	<b>Storage raw material outdoor</b>	PROC3,
<b>CS5</b>	<b>Storage raw material indoor</b>	PROC3,
<b>CS6</b>	<b>Assembly and charging: manually from bulk indoor</b>	PROC8b,
<b>CS7</b>	<b>Assembly and charging: manually from bulk outdoor</b>	PROC8b,
<b>CS8</b>	<b>Blending/dissolving/dispersion: Batch Open sampling and additional</b>	PROC5,
<b>CS9</b>	<b>Manufacturing equipment cleaning: open in-situ/off-line</b>	PROC5,
<b>CS10</b>	<b>Waste management, Transfer of recovered solvent into bulk storage tanks or IBCs</b>	PROC8b, 26, 91, 61
<b>CS11</b>	<b>Laboratory use: QC laboratory use</b>	PROC15, MP0111

**1.2. Conditions of use affecting exposure**

**1.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation of biocidal products () / SPERC ESVOC 2.2.o.v2 ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 100 %
Annual amount per site	: 97 t
Daily amount per site	: <= 320 kg
Emission Days (days/year):	: 300
Maximum daily local emission to waste water	: 1.6 kg
Maximum daily local emission to air	: 1.6 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Biological Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d



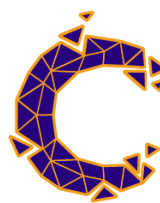
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**1.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Reception raw material from bulk ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.3. 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) / Reception raw material from package ()**

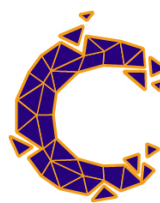
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	



Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.4. 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) / Storage raw material outdoor ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

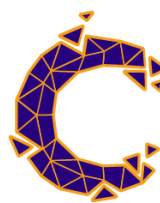


**1.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90$ %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	



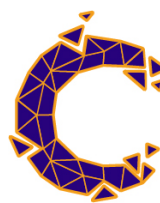
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 95\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk outdoor ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.8. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Blending/dissolving/dispersion: Batch Open sampling and additional ( )**

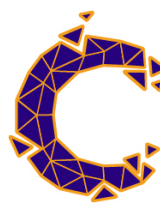
<b>Product (article) characteristics</b>
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Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.9. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Manufacturing equipment cleaning: open in-situ/off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	



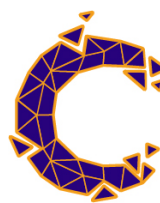
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.10. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Waste management (26, 91) / Transfer of recovered solvent into bulk storage tanks or IBCs (61)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**1.2.11. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory use: QC laboratory use (MP0111)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

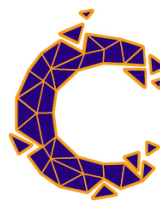
### 1.3. Exposure estimation and reference to its source

#### 1.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation of biocidal products () / SPERC ESVOC 2.2.o.v2 ()

Compartment	Exposure level	RCR
Freshwater	0.081 mg/L (EUSES v2.1)	0.407
Freshwater sediment	0.438 mg/kg dry weight (EUSES v2.1)	0.37
Marine water	0.00807 mg/L (EUSES v2.1)	0.04
Marine sediment	0.043 mg/kg dry weight (EUSES v2.1)	0.366
Sewage treatment plant	0.798 mg/L (EUSES v2.1)	0.08
Agricultural soil	0.017 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000449 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00334 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day	0.137





			(ECETOC TRA worker v3)	
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.458

**1.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Reception raw material from package ()**

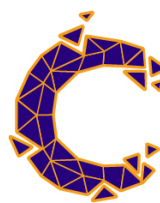
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.262

**1.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.262

**1.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



			characterisation.)	
combined routes	systemic	long-term		0.034

**1.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.03

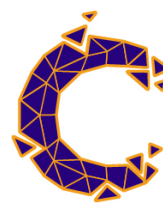
**1.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.458

**1.3.8. Worker exposure: Mixing or blending in batch processes (PROC5) / Blending/dissolving/dispersion: Batch Open sampling and additional ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.06

**1.3.9. Worker exposure: Mixing or blending in batch processes (PROC5) / Manufacturing equipment cleaning: open in-situ/off-line ()**



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Revision Date 06.12.2023

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.06

**1.3.10. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Waste management (26, 91) / Transfer of recovered solvent into bulk storage tanks or IBCs (61)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.458

**1.3.11. Worker exposure: Use as laboratory reagent (PROC15) / Laboratory use: QC laboratory use (MP0111)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.046

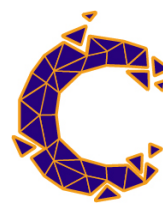
**1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency



- dilution factor

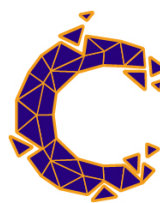
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES2: Consumer use, Use into insect repellent products**

**2.1. Title section**

<b>Structured Short Title</b>	: Consumer use
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<b>Environment</b>		
<b>CS1</b>	<b>End use of insect repellent products</b>	ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>Use of biocidal products (insect repellent), Electric room diffuser, Indoor</b>	PC8,,, OC8
<b>CS3</b>	<b>Use of biocidal products (insect repellent), Electric diffuser, Outdoor</b>	PC8,,, OC9

**2.2. Conditions of use affecting exposure**

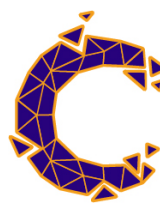
**2.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of insect repellent products ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
EU tonnage (T/year)	: 60
Fraction of EU tonnage used in region:	: 10 %
Annual amount per site	: 0.012 t
Daily amount per site	: <= 0.033 kg
Emission Days (days/year):	: 365
Maximum daily local emission to waste water	: 0.033 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**2.2.2. Control of consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8) / Use of biocidal products (insect repellent) () / Electric room diffuser () / Indoor (OC8)**

<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**2.2.3. Control of consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8) / Use of biocidal products (insect repellent) () / Electric diffuser () / Outdoor (OC9)**



Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Outdoor use

## 2.3. Exposure estimation and reference to its source

### 2.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of insect repellent products ()

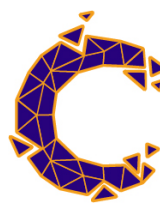
Compartment	Exposure level	RCR
Freshwater	0.0034 mg/L (EUSES v2.1)	0.017
Freshwater sediment	0.018 mg/kg dry weight (EUSES v2.1)	0.015
Marine water	0.000252 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00136 mg/kg dry weight (EUSES v2.1)	0.011
Sewage treatment plant	0.016 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00942 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000795 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000873 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

### 2.3.2. Consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8) / Use of biocidal products (insect repellent) () / Electric room diffuser () / Indoor (OC8)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.057 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	0 mg/kg bw/day (AISE REACT)	< 0.01
combined routes	systemic	long-term		< 0.01

### 2.3.3. Consumer exposure: Biocidal products (e.g. Disinfectants, pest control) (PC8) / Use of biocidal products (insect repellent) () / Electric diffuser () / Outdoor (OC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.057 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	0 mg/kg bw/day (AISE REACT)	< 0.01



combined routes	systemic	long-term		< 0.01
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#### 2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

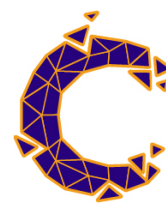
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES3: Use at industrial site, Use in oil and gas field drilling and production operations**

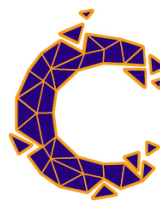
**3.1. Title section**

<b>Structured Short Title</b>	: Use at industrial sites
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Environment		
CS1	Use in Oil and Gas field drilling and production operations	ERC4, GEST5_I
Worker		
CS2	Bulk transfers from tote tanks and supply vessels, Dedicated facility	PROC8b, CS114, CS81
CS3	Charge from drums: filling / preparation of equipment (from drums or containers), dedicated facility	PROC8b,
CS4	Drilling mud (re-)formulation, Use in contained batch processes, Indoor	PROC3, CS115, CS37, OC8
CS5	Drill floor operations, Outdoor	PROC4, CS116, OC9
CS6	Cleaning of solids filtering equipment, Non-dedicated facility	PROC8a, CS120, CS82
CS7	Treatment and disposal of filtered solids: use in contained batch process outdoor	PROC3,
CS8	Treatment and disposal of filtered solids: use in contained batch process indoor	PROC3,
CS9	Sample collection: process sampling indoor	PROC3,
CS10	Sample collection: process sampling outdoor	PROC3,
CS11	In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor	PROC1,
CS12	Application by pouring from jug into system, Non-dedicated facility, Indoor	PROC8a,, CS82, OC8
CS13	Application by pouring from jug into system, Non-dedicated facility, Outdoor	PROC8a,, CS82, OC9
CS14	Scale squeeze operations, (open systems), Outdoor	PROC4,, CS108, OC9
CS15	Scale squeeze operations, (open systems), Indoor	PROC4,, CS108, OC8
CS16	Clean down and Maintenance (enclosed lines)	PROC8a,
CS17	Bulk storage: enclosed process, closed/semi-closed	PROC1,
CS18	Bulk storage: enclosed process, closed/semi-closed	PROC2,

**3.2. Conditions of use affecting exposure**

**3.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use in Oil and Gas field drilling and production operations (GEST5\_I)**

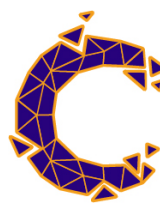




Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: <= 40 t
Daily amount per site	: <= 2 t
Maximum daily local emission to waste water	: 2 kg
Maximum daily local emission to air	: 2 kg
Conditions and measures related to sewage treatment plant	
STP type	: Biological Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m3/d

**3.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Bulk transfers from tote tanks and supply vessels (CS114) / Dedicated facility (CS81)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 1 hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	



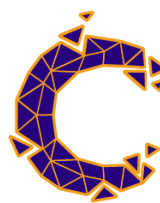
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Charge from drums: filling / preparation of equipment (from drums or containers), dedicated facility ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 1 hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Drilling mud (re-)formulation (CS115) / Use in contained batch processes (CS37) / Indoor (OC8)**

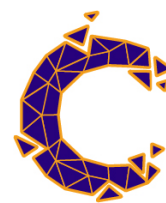
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 4 hours/day



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Drill floor operations (CS116) / Outdoor (OC9)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity $\leq 4$ hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

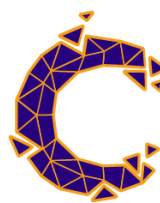


**3.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Cleaning of solids filtering equipment (CS120) / Non-dedicated facility (CS82)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.7. 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) / Treatment and disposal of filtered solids: use in contained batch process outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	

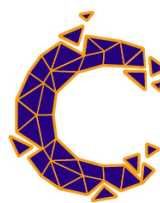


Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.8. 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) / Treatment and disposal of filtered solids: use in contained batch process indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 4$ hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 90 %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

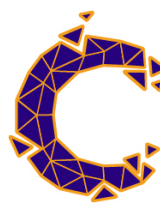
**3.2.9. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection: process sampling indoor ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 minutes/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.10. 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) / Sample collection: process sampling outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 minutes/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	



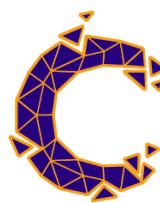
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.11. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Indoor (OC8)**

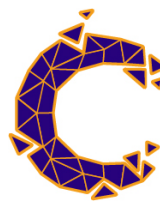
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 minutes/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 minutes/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





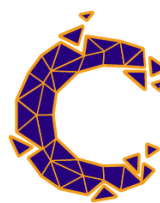
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.14. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.15. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Indoor (OC8)**

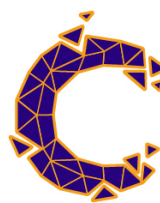
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	



Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance (enclosed lines) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

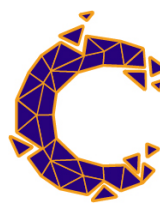


**3.2.17. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Bulk storage: enclosed process, closed/semi-closed ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**3.2.18. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Bulk storage: enclosed process, closed/semi-closed ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	



Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 3.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use in Oil and Gas field drilling and production operations (GEST5\_I)

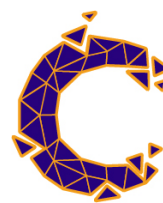
Compartment	Exposure level	RCR
Marine water	0.01 mg/L (EUSES v2.1)	0.05
Marine sediment	0.054 mg/kg dry weight (EUSES v2.1)	0.457
Man via environment - Inhalation	0.000104 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00135 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 3.3.2. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Bulk transfers from tote tanks and supply vessels (CS114) / Dedicated facility (CS81)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.338

#### 3.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Charge from drums: filing / preparation of equipment (from drums or containers), dedicated facility ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366



**3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Drilling mud (re-)formulation (CS115) / Use in contained batch processes (CS37) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.912 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.165
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.179

**3.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Drill floor operations (CS116) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.33

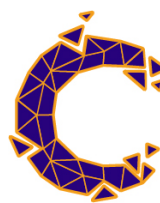
**3.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Cleaning of solids filtering equipment (CS120) / Non-dedicated facility (CS82)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.293

**3.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Treatment and disposal of filtered solids: use in contained batch process outdoor ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.388 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.028 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.026

**3.3.8. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Treatment and disposal of filtered solids: use in contained batch process indoor ( )**



Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.198 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.028 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**3.3.9. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection: process sampling indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.041

**3.3.10. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection: process sampling outdoor ()**

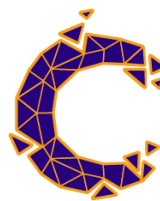
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.156 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.019
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.033

**3.3.11. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.039 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**3.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA)	0.092



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Revision Date 06.12.2023

			worker v3)	
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366

**3.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.338

**3.3.14. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Outdoor (OC9)**

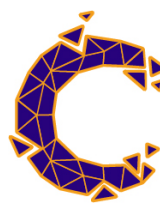
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.458

**3.3.15. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183

**3.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance (enclosed lines) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.293



**3.3.17. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Bulk storage: enclosed process, closed/semi-closed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**3.3.18. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Bulk storage: enclosed process, closed/semi-closed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.155

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

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

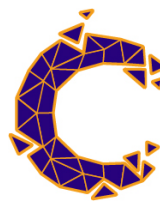
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.





**ES4: Widespread use by professional workers, Use in oil and gas field drilling and production operations**

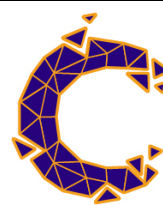
**4.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
CS1	Use in Oil and Gas field drilling and production operations	ERC8a, GEST5_I
Worker		
CS2	Bulk transfers from tote tanks and supply vessels, dedicated facility (enclosed transfer): outdoor	PROC8b,
CS3	Charge from drums: filing / preparation of equipment (from drums or containers), dedicated facility	PROC8b,
CS4	Drilling mud (re-)formulation, Use in contained batch processes, Indoor	PROC3, CS115, CS37, OC8
CS5	Drilling head operations: outdoor	PROC4,
CS6	Operation of solids filtering equipment - vapour exposures, Indoor	PROC4, CS118, OC8
CS7	Operation of solids filtering equipment - aerosol exposures, Indoor	PROC4, CS119, OC8
CS8	Cleaning of solids filtering equipment, Non-dedicated facility	PROC8a, CS120, CS82
CS9	Treatment and disposal of filtered solids: use in contained batch process outdoor	PROC3,
CS10	Treatment and disposal of filtered solids: use in contained batch process indoor	PROC3,
CS11	Sample collection: process sampling indoor	PROC3,
CS12	Sample collection: process sampling outdoor	PROC3,
CS13	In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor	PROC1,
CS14	Application by pouring from jug into system, Non-dedicated facility, Indoor	PROC8a,, CS82, OC8
CS15	Scale squeeze operations, (open systems), Outdoor	PROC4,, CS108, OC9
CS16	Clean down and Maintenance (enclosed lines)	PROC8a,
CS17	Bulk storage: enclosed process, closed/semi-closed	PROC1,
CS18	Bulk storage: enclosed process, closed/semi-closed	PROC2,

**4.2. Conditions of use affecting exposure**

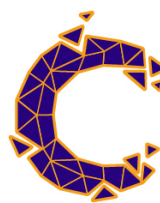
**4.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Use in Oil and Gas field drilling and production operations (GEST5\_I)**



Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 0.022 kg
Maximum daily local emission to waste water	: 0.022 kg
Maximum daily local emission to air	: 0.022 kg
Conditions and measures related to sewage treatment plant	
STP type	: Biological Sewage Treatment Plant
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations

**4.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Bulk transfers from tote tanks and supply vessels, dedicated facility (enclosed transfer): outdoor ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 1 hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

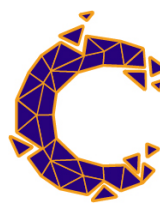


**4.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Charge from drums: filling / preparation of equipment (from drums or containers), dedicated facility ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Drilling mud (re-)formulation (CS115) / Use in contained batch processes (CS37) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	



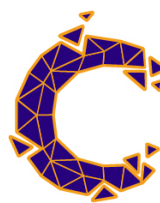
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Drilling head operations: outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 4$ hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Operation of solids filtering equipment - vapour exposures (CS118) / Indoor (OC8)**

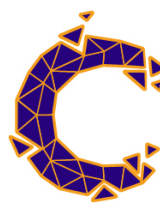
<b>Product (article) characteristics</b>
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Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 80 %	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80$ %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 60 °C

**4.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Operation of solids filtering equipment - aerosol exposures (CS119) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 80 %	
Occupational Health and Safety Management System: Basic.	

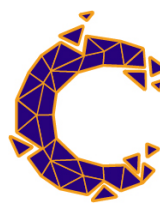


Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 60 °C

**4.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Cleaning of solids filtering equipment (CS120) / Non-dedicated facility (CS82)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity $\leq 1$ hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 80\%$	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

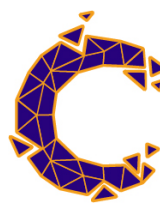
**4.2.9. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Treatment and disposal of filtered solids: use in contained batch process outdoor ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.10. 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) / Treatment and disposal of filtered solids: use in contained batch process indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 80 %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	



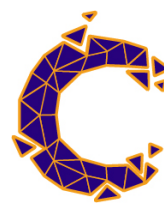
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.11. 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) / Sample collection: process sampling indoor ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity $\leq 15$ minutes/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.12. 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) / Sample collection: process sampling outdoor ()**

Product (article) characteristics

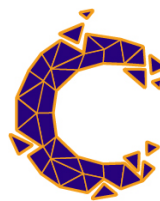




Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 minutes/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.13. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	



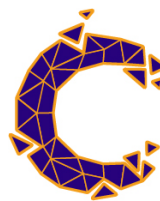
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Indoor (OC8)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 15 minutes/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.15. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Outdoor (OC9)**

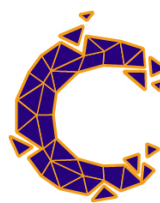
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours



<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance (enclosed lines) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 80 %	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

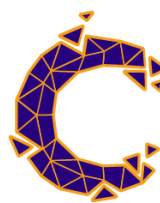


**4.2.17. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Bulk storage: enclosed process, closed/semi-closed ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**4.2.18. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Bulk storage: enclosed process, closed/semi-closed ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	



without local exhaust ventilation	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

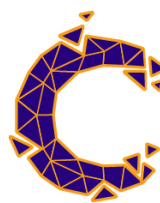
##### 4.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Use in Oil and Gas field drilling and production operations (GEST5\_I)

Compartment	Exposure level	RCR
Freshwater	0.00279 mg/L (EUSES v2.1)	0.014
Freshwater sediment	0.015 mg/kg dry weight (EUSES v2.1)	0.013
Marine water	0.000197 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00106 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0.011 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00937 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000795 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00087 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

##### 4.3.2. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Bulk transfers from tote tanks and supply vessels, dedicated facility (enclosed transfer): outdoor ( )

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	7.709 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.128
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.403

##### 4.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Charge from drums: filling / preparation of equipment (from drums or containers), dedicated facility ( )



Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.458

**4.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Drilling mud (re-)formulation (CS115) / Use in contained batch processes (CS37) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.912 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.165
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.179

**4.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Drilling head operations: outdoor ( )**

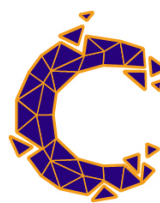
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	23.12 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.385
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.523

**4.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Operation of solids filtering equipment - vapour exposures (CS118) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.596

**4.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Operation of solids filtering equipment - aerosol exposures (CS119) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR



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Revision Date 06.12.2023

inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.596

**4.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Cleaning of solids filtering equipment (CS120) / Non-dedicated facility (CS82)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.366

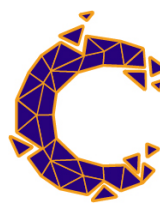
**4.3.9. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Treatment and disposal of filtered solids: use in contained batch process outdoor ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.388 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.028 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.026

**4.3.10. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Treatment and disposal of filtered solids: use in contained batch process indoor ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.396 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.028 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**4.3.11. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection: process sampling indoor ( )**



Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.041

**4.3.12. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection: process sampling outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.156 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.019
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.033

**4.3.13. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / In-line injection (of process chemicals) by fixed dosing pump (closed systems): outdoor ()**

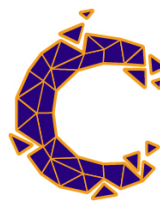
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.039 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**4.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application by pouring from jug into system () / Non-dedicated facility (CS82) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.636 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.161
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.435

**4.3.15. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Scale squeeze operations () / (open systems) (CS108) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.642





dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.78

**4.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance (enclosed lines) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366

**4.3.17. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Bulk storage: enclosed process, closed/semi-closed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**4.3.18. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Bulk storage: enclosed process, closed/semi-closed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229

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

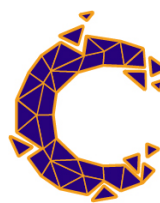
Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

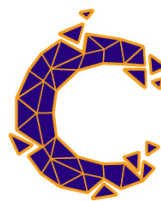


Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



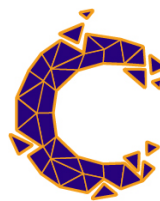
**ES5:**

**5.1. Title section**

**5.2. Conditions of use affecting exposure**

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

**5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

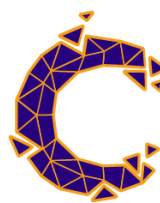


**ES6: Formulation or re-packing, Formulation of coating products**

**6.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing
-------------------------------	-----------------------------

Environment		
CS1	Formulation of coatings	ERC2,
Worker		
CS2	Reception raw material from bulk	PROC8b,
CS3	Reception raw material from package	PROC3,
CS4	Storage raw material outdoor	PROC3,
CS5	Storage raw material indoor	PROC3,
CS6	Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - indoor	PROC1,
CS7	Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - outdoor	PROC1,
CS8	Assembly and charging: manually from bulk indoor	PROC8b,
CS9	Assembly and charging: manually from bulk outdoor	PROC8b,
CS10	Blending/dissolving/dispersion: Continue Closed sampling	PROC2,
CS11	Blending/dissolving/dispersion: Batch Closed sampling	PROC3,
CS12	Blending/dissolving/dispersion: Batch Open sampling and additional	PROC5,
CS13	Filtering and filling: dedicate lines open or enclosed	PROC9,
CS14	Filtering and filling: non-dedicate lines open or enclosed	PROC8a,
CS15	Manufacturing equipment cleaning: enclosed in-situ/off-line	PROC2,
CS16	Manufacturing equipment cleaning: open in-situ/off-line	PROC5,
CS17	Waste management: Transfer of process wastes to storage containers in workplace/Off-line	PROC8b,
CS18	Waste management: storage of waste prior to removal for off-site management	PROC3, MP0071
CS19	Waste management: Solvent recovery/Condensation or adsorption/desorption processes	PROC3,
CS20	Waste management, Transfer of recovered solvent into bulk storage tanks or IBCs	PROC8b, 26, 91, 61
CS21	Manufacturing equipment maintenance: Opening for repair and cleaning manufacturing equipment and pipework containing chemicals	PROC8b,
CS22	Laboratory use: QC laboratory use, Laboratory use: R&D laboratory use	PROC15, 64, 139, 65



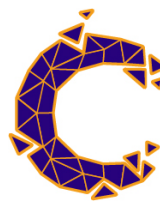
## 6.2. Conditions of use affecting exposure

### 6.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation of coatings ( )

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 100 %
Annual amount per site	: <= 160 t
Daily amount per site	: <= 1.6 t
Emission Days (days/year):	: >= 100
Maximum daily local emission to waste water	: 0 kg
Maximum daily local emission to air	: 57.6 kg
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m3/d

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

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use



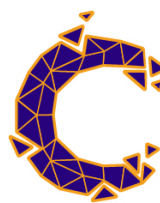
Temperature	: Assumes process temperature up to 40 °C
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**6.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Reception raw material from package ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.4. 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) / Storage raw material outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	



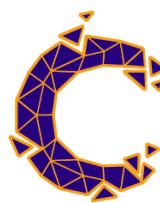
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.5. 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) / Storage raw material indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90$ %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.6. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - indoor ()**

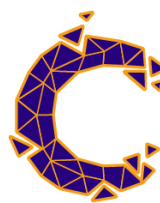
<b>Product (article) characteristics</b>
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Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.7. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - outdoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





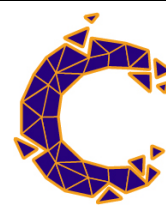
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.8. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk indoor ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 95\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.9. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk outdoor ( )**

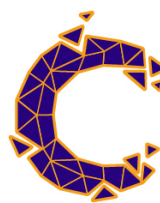
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and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



Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.10. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Blending/dissolving/dispersion: Continue Closed sampling ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90\%$	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

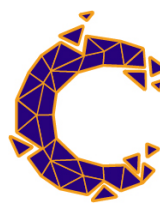


**6.2.11. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Blending/dissolving/dispersion: Batch Closed sampling ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.12. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Blending/dissolving/dispersion: Batch Open sampling and additional ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

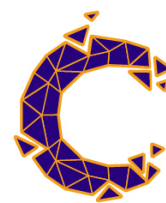


with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Filtering and filling: dedicate lines open or enclosed ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

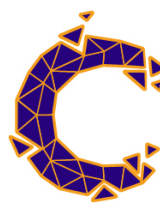
**6.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Filtering and filling: non-dedicate lines open or enclosed ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.15. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacturing equipment cleaning: enclosed in-situ/off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	

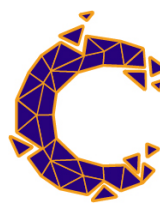


Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.16. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Manufacturing equipment cleaning: open in-situ/off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

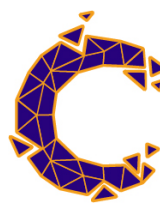
**6.2.17. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Waste management: Transfer of process wastes to storage containers in workplace/Off-line ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 95\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.18. 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) / Waste management: storage of waste prior to removal for off-site management (MP0071)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	



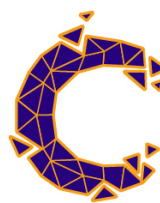
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.19. 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) / Waste management: Solvent recovery/Condensation or adsorption/desorption processes ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.20. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Waste management (26, 91) / Transfer of recovered solvent into bulk storage tanks or IBCs (61)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid

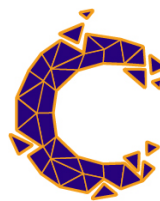




<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**6.2.21. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manufacturing equipment maintenance: Opening for repair and cleaning manufacturing equipment and pipework containing chemicals ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 95\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	



Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

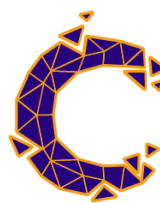
**6.2.22. Control of worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (64, 139) / R&D laboratory (65)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

**6.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation of coatings ()**

Compartment	Exposure level	RCR
Freshwater	0.0017 mg/L (EUSES v2.1)	< 0.01
Freshwater sediment	0.00912 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.0000875 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.000471 mg/kg dry weight (EUSES v2.1)	< 0.01



Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.012 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.00447 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.011 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**6.3.2. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Reception raw material from bulk ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.458

**6.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Reception raw material from package ()**

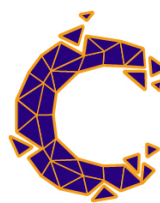
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.262

**6.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.262

**6.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028



dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.034

**6.3.6. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**6.3.7. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Raw material assembly and charging: raw material dispensing of liquids pipeline from bulk storage - outdoor ()**

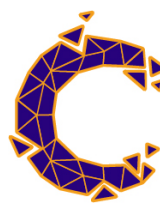
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.039 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**6.3.8. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.03

**6.3.9. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Assembly and charging: manually from bulk outdoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.458



**6.3.10. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Blending/dissolving/dispersion: Continue Closed sampling ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.014 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.011

**6.3.11. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3) / Blending/dissolving/dispersion: Batch Closed sampling ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.0069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.028

**6.3.12. Worker exposure: Mixing or blending in batch processes (PROC5) / Blending/dissolving/dispersion: Batch Open sampling and additional ()**

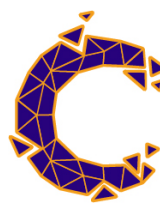
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.06

**6.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Filtering and filling: dedicate lines open or enclosed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.053

**6.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Filtering and filling: non-dedicate lines open or enclosed ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup>	0.092



			(ECETOC TRA worker v3)	
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.105

**6.3.15. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Manufacturing equipment cleaning: enclosed in-situ/off-line ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.014 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.011

**6.3.16. Worker exposure: Mixing or blending in batch processes (PROC5) / Manufacturing equipment cleaning: open in-situ/off-line ()**

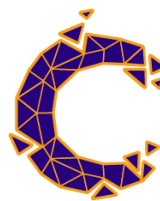
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.06

**6.3.17. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Waste management: Transfer of process wastes to storage containers in workplace/Off-line ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.03

**6.3.18. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Waste management: storage of waste prior to removal for off-site management (MP0071)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA)	0.069



			worker v3)	
combined routes	systemic	long-term		0.262

**6.3.19. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Waste management: Solvent recovery/Condensation or adsorption/desorption processes ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.2

**6.3.20. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Waste management (26, 91) / Transfer of recovered solvent into bulk storage tanks or IBCs (61)**

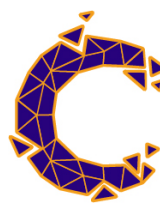
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.458

**6.3.21. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manufacturing equipment maintenance: Opening for repair and cleaning manufacturing equipment and pipework containing chemicals ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.03

**6.3.22. Worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (64, 139) / R&D laboratory (65)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.046



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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

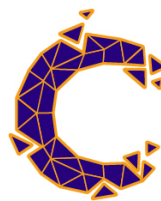
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



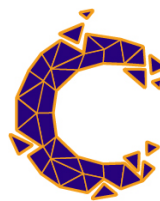


**ES7: Use at industrial site, Industrial coating uses**

**7.1. Title section**

<b>Structured Short Title</b>	: Use at industrial sites
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Environment		
CS1	Product storage, FEICA SPERC 4.2a.v2	ERC4, 93,
Worker		
CS2	Reception raw material from bulk	PROC8b,
CS3	Reception raw material from package	PROC3,
CS4	Storage raw material indoor	PROC3,
CS5	Storage raw material outdoor	PROC3,
CS6	Preparation of material for application, Enclosed	PROC1, CS96, 46, 104
CS7	Preparation of material for application, Continuous process	PROC2, CS96, CS54
CS8	Preparation of material for application, Batch process	PROC5, CS96, CS55
CS9	Preparation of material for application (liquid coatings) - transfer of material from one container to another	PROC8b, AI0108
CS10	Loading of application equipment (liquid coatings) - fully enclosed	PROC1, AI0201
CS11	Loading of application equipment - closed, continuous	PROC2, AP0302
CS12	Loading of application equipment - batch, indoor	PROC8b, AP0303
CS13	Loading of application equipment - batch, outdoor	PROC8a, AP0304
CS14	Loading of application equipment - transfer of material from one container to another - indoor	PROC8b, AP0305
CS15	On-line application by roller, spreader, flow coating or printing - large scale (open equipment)	PROC10, AI0301
CS16	On-line application by roller, spreader, flow coating or printing - large scale (enclosed equipment)	PROC10, AI0302
CS17	Automatic/robotic spray coating or printing (enclosed equipment): on-line, printing inks	PROC10,
CS18	Manual spraying (open equipment): on-line and off-line	PROC7,
CS19	Manual spraying (open equipment): off-line, manual spraying, open equipment	PROC7,
CS20	On-line application by dipping	PROC7, AI0309
CS21	Fluidised-bed application (manual/open)	PROC13, AI0311
CS22	On-line application by dipping	PROC13, AI0309
CS23	Fluidised-bed application (automatic/enclosed)	PROC13, AI0310

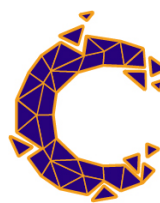


CS24	Application of coatings from aerosol dispensers	PROC7, AI0312
CS25	Film formation - air drying	PROC4, CS95
CS26	Film formation - force drying (50 - 100 °C)	PROC2, AP0504 AP0505
CS27	Film formation - stoving (>100 °C)	PROC2, AP0506 AP0507
CS28	Film formation - UV/EB radiation curing	PROC2, AI0505 AI0506
CS29	Application equipment cleaning: enclosed/indoor/in-situ/off-line	PROC3,
CS30	Application equipment cleaning: open/indoor/in-situ/off-line	PROC5,
CS31	Application equipment cleaning: open/outdoor/in-situ/off-line	PROC5,
CS32	Laboratory use: QC laboratory use	PROC15, 64, 139
CS33	Waste management: storage of waste prior to removal for off-site management	PROC3, MP0071
CS34	Waste management: transfer of process wastes to storage containers: off-line in workplace	PROC8b,

## 7.2. Conditions of use affecting exposure

### 7.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Product storage (93) / FEICA SPERC 4.2a.v2 ()

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 100 %
Annual amount per site	: <= 160 t
Daily amount per site	: <= 8 t
Maximum daily local emission to waste water	: 0 kg
Maximum daily local emission to air	: 136 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Biological Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	



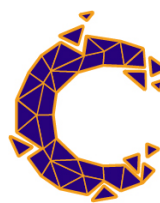
Receiving surface water flow	: 18,000 m3/d
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**7.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Reception raw material from bulk ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.3. 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) / Reception raw material from package ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	



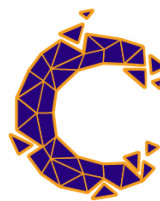
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.4. 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) / Storage raw material indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90$ %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.5. 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) / Storage raw material outdoor ()**

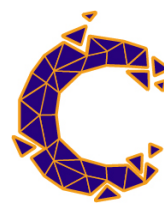
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.6. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Preparation of material for application (CS96) / Enclosed (46, 104)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



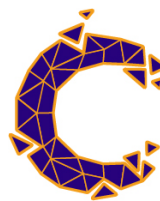
Temperature	: Assumes process temperature up to 40 °C
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**7.2.7. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Preparation of material for application (CS96) / Continuous process (CS54)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90$ %	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.8. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Batch process (CS55)**

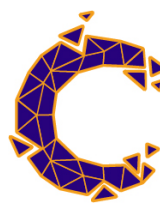
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	



Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.9. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Preparation of material for application (liquid coatings) - transfer of material from one container to another (AI0108)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

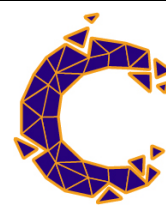


**7.2.10. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Loading of application equipment (liquid coatings) - fully enclosed (AI0201)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.11. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Loading of application equipment - closed, continuous (AP0302)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	



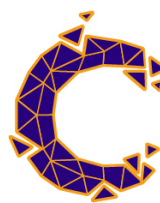


with local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to $40\text{ }^{\circ}\text{C}$

**7.2.12. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Loading of application equipment - batch, indoor (AP0303)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to $100\%$ .	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $95\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to $40\text{ }^{\circ}\text{C}$

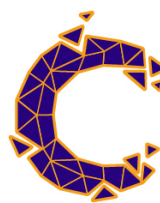
**7.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of application equipment - batch, outdoor (AP0304)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.14. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Loading of application equipment - transfer of material from one container to another - indoor (AP0305)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	



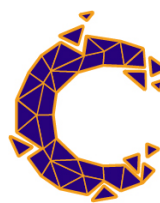
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.15. Control of worker exposure: Roller application or brushing (PROC10) / On-line application by roller, spreader, flow coating or printing - large scale (open equipment) (AI0301)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.16. Control of worker exposure: Roller application or brushing (PROC10) / On-line application by roller, spreader, flow coating or printing - large scale (enclosed equipment) (AI0302)**

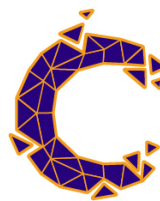
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.17. Control of worker exposure: Roller application or brushing (PROC10) / Automatic/robotic spray coating or printing (enclosed equipment): on-line, printing inks ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	



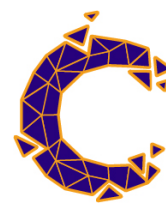
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.18. Control of worker exposure: Industrial spraying (PROC7) / Manual spraying (open equipment): on-line and off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.19. Control of worker exposure: Industrial spraying (PROC7) / Manual spraying (open equipment): off-line, manual spraying, open equipment ()**

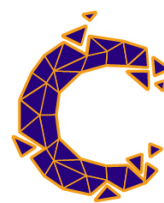
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	



Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.20. Control of worker exposure: Industrial spraying (PROC7) / On-line application by dipping (AI0309)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	



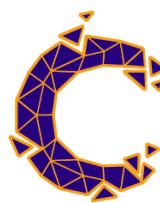
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.21. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Fluidised-bed application (manual/open) (AI0311)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.22. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / On-line application by dipping (AI0309)**

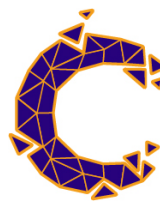
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours



<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.23. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Fluidised-bed application (automatic/enclosed) (AI0310)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





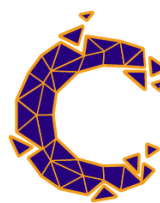
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.24. Control of worker exposure: Industrial spraying (PROC7) / Application of coatings from aerosol dispensers (AI0312)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.25. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Film formation - air drying (CS95)**

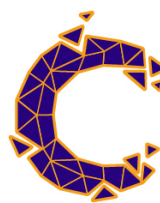
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and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



Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.26. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - force drying (50 - 100 °C) (AP0504 AP0505)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	



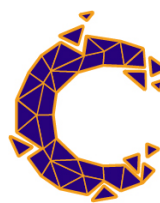
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 90 °C

**7.2.27. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - stoving (>100 °C) (AP0506 AP0507)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 110 °C

**7.2.28. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - UV/EB radiation curing (AI0505 AI0506)**

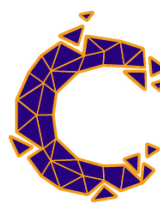
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.29. 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) / Application equipment cleaning: enclosed/indoor/in-situ/off-line ()**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use



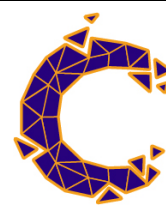
Temperature : Assumes process temperature up to 40 °C

**7.2.30. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Application equipment cleaning: open/indoor/in-situ/off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.31. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Application equipment cleaning: open/outdoor/in-situ/off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	

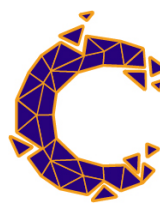


Avoid splashing.	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.32. Control of worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (64, 139)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

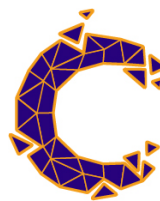
**7.2.33. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Waste management: storage of waste prior to removal for off-site management (MP0071)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**7.2.34. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Waste management: Transfer of process wastes to storage containers in workplace/Off-line ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 95$ %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	



Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 7.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Product storage (93) / FEICA SPERC 4.2a.v2 ()

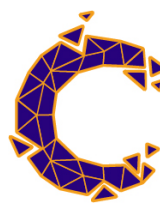
Compartment	Exposure level	RCR
Freshwater	0.0017 mg/L (EUSES v2.1)	< 0.01
Freshwater sediment	0.00912 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.0000875 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.000471 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.011 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.00215 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00577 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.458

#### 7.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Reception raw material from package ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day	0.069





			(ECETOC TRA worker v3)	
combined routes	systemic	long-term		0.262

**7.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.034

**7.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Storage raw material outdoor ()**

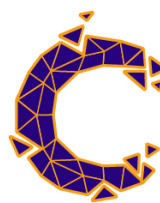
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.262

**7.3.6. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Preparation of material for application (CS96) / Enclosed (46, 104)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**7.3.7. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Preparation of material for application (CS96) / Continuous process (CS54)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.023



**7.3.8. Worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Batch process (CS55)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.06

**7.3.9. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Preparation of material for application (liquid coatings) - transfer of material from one container to another (AI0108)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.03

**7.3.10. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Loading of application equipment (liquid coatings) - fully enclosed (AI0201)**

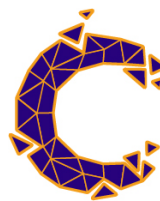
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**7.3.11. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Loading of application equipment - closed, continuous (AP0302)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.014 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.011

**7.3.12. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Loading of application equipment - batch, indoor (AP0303)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR



inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.091

**7.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of application equipment - batch, outdoor (AP0304)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.642
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.78

**7.3.14. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b) / Loading of application equipment - transfer of material from one container to another - indoor (AP0305)**

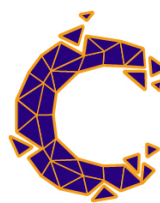
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.03

**7.3.15. Worker exposure: Roller application or brushing (PROC10) / On-line application by roller, spreader, flow coating or printing - large scale (open equipment) (AI0301)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366

**7.3.16. Worker exposure: Roller application or brushing (PROC10) / On-line application by roller, spreader, flow coating or printing - large scale (enclosed equipment) (AI0302)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA)	0.274



			worker v3)	
combined routes	systemic	long-term		0.366

**7.3.17. Worker exposure: Roller application or brushing (PROC10) / Automatic/robotic spray coating or printing (enclosed equipment): on-line, printing inks ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366

**7.3.18. Worker exposure: Industrial spraying (PROC7) / Manual spraying (open equipment): on-line and off-line ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.214 mg/kg bw/day (ECETOC TRA worker v3)	0.021
combined routes	systemic	long-term		0.48

**7.3.19. Worker exposure: Industrial spraying (PROC7) / Manual spraying (open equipment): off-line, manual spraying, open equipment ( )**

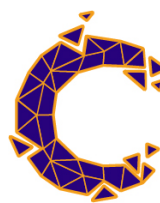
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	0.214 mg/kg bw/day (ECETOC TRA worker v3)	0.021
combined routes	systemic	long-term		0.343

**7.3.20. Worker exposure: Industrial spraying (PROC7) / On-line application by dipping (AI0309)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	0.214 mg/kg bw/day (ECETOC TRA worker v3)	0.021
combined routes	systemic	long-term		0.343

**7.3.21. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Fluidised-bed application (manual/open) (AI0311)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR



inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.105

**7.3.22. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / On-line application by dipping (AI0309)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.105

**7.3.23. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Fluidised-bed application (automatic/enclosed) (AI0310)**

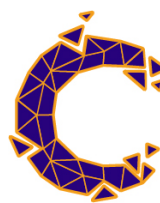
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.105

**7.3.24. Worker exposure: Industrial spraying (PROC7) / Application of coatings from aerosol dispensers (AI0312)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.214 mg/kg bw/day (ECETOC TRA worker v3)	0.021
combined routes	systemic	long-term		0.48

**7.3.25. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Film formation - air drying (CS95)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.073



**7.3.26. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - force drying (50 - 100 °C) (AP0504 AP0505)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.037

**7.3.27. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - stoving (>100 °C) (AP0506 AP0507)**

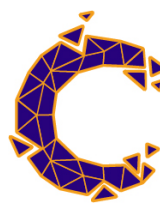
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.366

**7.3.28. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Film formation - UV/EB radiation curing (AI0505 AI0506)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.023

**7.3.29. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Application equipment cleaning: enclosed/indoor/in-situ/off-line ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.034



**7.3.30. Worker exposure: Mixing or blending in batch processes (PROC5) / Application equipment cleaning: open/indoor/in-situ/off-line ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.06

**7.3.31. Worker exposure: Mixing or blending in batch processes (PROC5) / Application equipment cleaning: open/outdoor/in-situ/off-line ()**

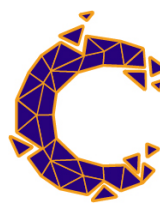
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.458

**7.3.32. Worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (64, 139)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.046

**7.3.33. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Waste management: storage of waste prior to removal for off-site management (MP0071)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193



dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.262

**7.3.34. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Waste management: Transfer of process wastes to storage containers in workplace/Off-line ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.03

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

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

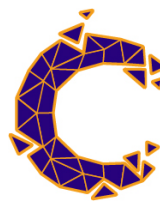
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



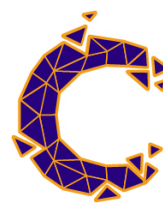


**ES8: Widespread use by professional workers, Professional coating uses**

**8.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
<b>CS1</b>	<b>Professional coating uses</b>	ERC8d, ERC8a,
Worker		
<b>CS2</b>	<b>General exposures (closed systems)</b>	PROC1, CS15
<b>CS3</b>	<b>General exposures (closed systems), Filling/ preparation of equipment from drums or containers.</b>	PROC2, CS15, CS45
<b>CS4</b>	<b>Preparation of material for application (liquid products) - batch, indoor</b>	PROC3, AI0105
<b>CS5</b>	<b>Preparation of material for application, Indoor, with local exhaust ventilation</b>	PROC5, CS96, OC8, CS109
<b>CS6</b>	<b>Preparation of material for application, Indoor, without local exhaust ventilation</b>	PROC5, CS96, OC8, CS110
<b>CS7</b>	<b>Preparation of material for application, Outdoor</b>	PROC5, CS96, OC9
<b>CS8</b>	<b>Drum/batch transfers, Non-dedicated facility, Indoor, with local exhaust ventilation</b>	PROC8a, CS8, CS82, OC8, CS109
<b>CS9</b>	<b>Drum/batch transfers, Non-dedicated facility, Indoor, without local exhaust ventilation</b>	PROC8a, CS8, CS82, OC8, CS110
<b>CS10</b>	<b>Drum/batch transfers, Non-dedicated facility, Outdoor</b>	PROC8a, CS8, CS82, OC9
<b>CS11</b>	<b>Drum/batch transfers, Dedicated facility, Indoor</b>	PROC8b, CS8, CS81, OC8
<b>CS12</b>	<b>Roller, spreader, flow application, Indoor</b>	PROC10, CS98, OC8
<b>CS13</b>	<b>Roller, spreader, flow application, Indoor</b>	PROC4, CS98, OC8
<b>CS14</b>	<b>Roller, spreader, flow application, Outdoor</b>	PROC10, CS98, OC9
<b>CS15</b>	<b>Manual spraying, Indoor</b>	PROC11, 111, OC8
<b>CS16</b>	<b>Manual spraying, Outdoor</b>	PROC11, 111, OC9
<b>CS17</b>	<b>Dipping, immersion and pouring, Indoor</b>	PROC13, CS4, OC8
<b>CS18</b>	<b>Dipping, immersion and pouring, Outdoor</b>	PROC13, CS4, OC9
<b>CS19</b>	<b>Laboratory activities</b>	PROC15
<b>CS20</b>	<b>Hand application - fingerpaints, pastels, adhesives, Indoor</b>	PROC19, CS72, OC8



CS21	Hand application - fingerpaints, pastels, adhesives, Outdoor	PROC19, CS72, OC9
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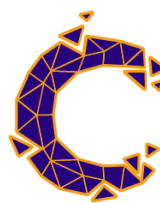
## 8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Professional coating uses ( )

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 0.088 kg
Maximum daily local emission to waste water	: 0.088 kg
Conditions and measures related to sewage treatment plant	
STP type	: Biological Sewage Treatment Plant
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations

8.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / General exposures (closed systems) (CS15)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	



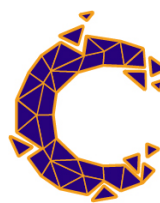
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General exposures (closed systems) (CS15) / Filling/ preparation of equipment from drums or containers. (CS45)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 80 %	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<u>General measures (eye irritants)</u>	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.4. 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) / Preparation of material for application (liquid products) - batch, indoor (AI0105)**

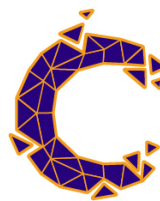
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.5. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Indoor (OC8) / with local exhaust ventilation (CS109)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 80 %	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	



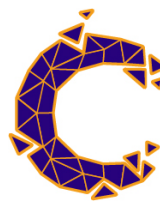
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Indoor (OC8) / without local exhaust ventilation (CS110)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Outdoor (OC9)**

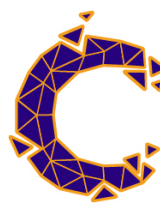
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Indoor (OC8) / with local exhaust ventilation (CS109)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 80 %	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	



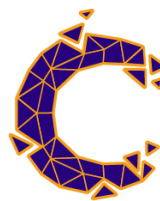
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Indoor (OC8) / without local exhaust ventilation (CS110)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Outdoor (OC9)**

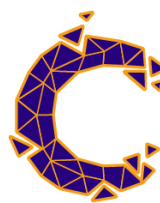
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Drum/batch transfers (CS8) / Dedicated facility (CS81) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 90 %	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	





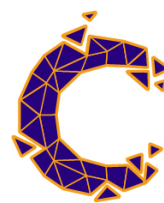
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.12. Control of worker exposure: Roller application or brushing (PROC10) / Roller, spreader, flow application (CS98) / Indoor (OC8)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.13. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Roller, spreader, flow application (CS98) / Indoor (OC8)**

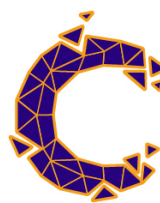
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	



Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 80\%$	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.14. Control of worker exposure: Roller application or brushing (PROC10) / Roller, spreader, flow application (CS98) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	



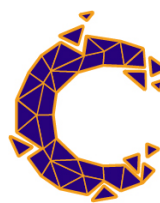
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.15. Control of worker exposure: Non-industrial spraying (PROC11) / Manual spraying (111) / Indoor (OC8)**

Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 80$ %	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.16. Control of worker exposure: Non-industrial spraying (PROC11) / Manual spraying (111) / Outdoor (OC9)**

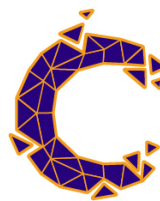
Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 4 h/day



<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.17. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Dipping, immersion and pouring (CS4) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 80\%$	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



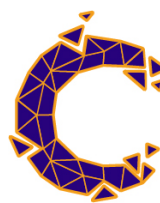
Temperature	: Assumes process temperature up to 40 °C
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**8.2.18. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Dipping, immersion and pouring (CS4) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90$ %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.19. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	

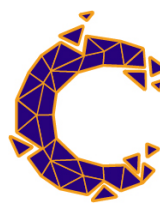


Inhalation - minimum efficiency of $\geq 80\%$	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.20. Control of worker exposure: Manual activities involving hand contact (PROC19) / Hand application - fingerprints, pastels, adhesives (CS72) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**8.2.21. Control of worker exposure: Manual activities involving hand contact (PROC19) / Hand application - fingerprints, pastels, adhesives (CS72) / Outdoor (OC9)**

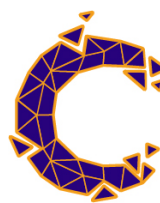


<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 5%.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of >= 90 %	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 8.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Professional coating uses ()

Compartment	Exposure level	RCR
Freshwater	0.00608 mg/L (EUSES v2.1)	0.03
Freshwater sediment	0.033 mg/kg dry weight (EUSES v2.1)	0.028
Marine water	0.000526 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00283 mg/kg dry weight (EUSES v2.1)	0.024
Sewage treatment plant	0.044 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00967 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000795 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00089 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01



**8.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / General exposures (closed systems) (CS15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01

**8.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General exposures (closed systems) (CS15) / Filling/ preparation of equipment from drums or containers. (CS45)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
combined routes	systemic	long-term		0.119

**8.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Preparation of material for application (liquid products) - batch, indoor (AI0105)**

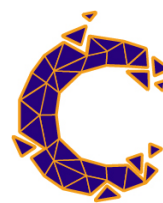
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.041

**8.3.5. Worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Indoor (OC8) / with local exhaust ventilation (CS109)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.293

**8.3.6. Worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Indoor (OC8) / without local exhaust ventilation (CS110)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR





inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366

**8.3.7. Worker exposure: Mixing or blending in batch processes (PROC5) / Preparation of material for application (CS96) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.313 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.039
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.313

**8.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Indoor (OC8) / with local exhaust ventilation (CS109)**

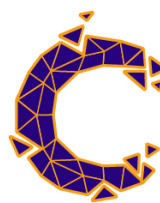
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.283

**8.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Indoor (OC8) / without local exhaust ventilation (CS110)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.32

**8.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Drum/batch transfers (CS8) / Non-dedicated facility (CS82) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274



combined routes	systemic	long-term		0.306
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**8.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Drum/batch transfers (CS8) / Dedicated facility (CS81) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.22 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.278

**8.3.12. Worker exposure: Roller application or brushing (PROC10) / Roller, spreader, flow application (CS98) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.504

**8.3.13. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Roller, spreader, flow application (CS98) / Indoor (OC8)**

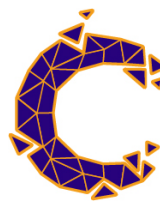
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.771 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.013
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.081

**8.3.14. Worker exposure: Roller application or brushing (PROC10) / Roller, spreader, flow application (CS98) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.636 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.161
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.435

**8.3.15. Worker exposure: Non-industrial spraying (PROC11) / Manual spraying (111) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.203 mg/m <sup>3</sup>	0.037



			(ECETOC TRA worker v3)	
dermal	systemic	long-term	2.143 mg/kg bw/day (ECETOC TRA worker v3)	0.214
combined routes	systemic	long-term		0.251

**8.3.16. Worker exposure: Non-industrial spraying (PROC11) / Manual spraying (111) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	4.626 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.077
dermal	systemic	long-term	4.286 mg/kg bw/day (ECETOC TRA worker v3)	0.429
combined routes	systemic	long-term		0.506

**8.3.17. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Dipping, immersion and pouring (CS4) / Indoor (OC8)**

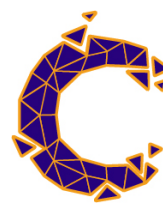
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.293

**8.3.18. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Dipping, immersion and pouring (CS4) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.201

**8.3.19. Worker exposure: Use as laboratory reagent (PROC15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.099



**8.3.20. Worker exposure: Manual activities involving hand contact (PROC19) / Hand application - fingerpaints, pastels, adhesives (CS72) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.165 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.829 mg/kg bw/day (ECETOC TRA worker v3)	0.283
combined routes	systemic	long-term		0.286

**8.3.21. Worker exposure: Manual activities involving hand contact (PROC19) / Hand application - fingerpaints, pastels, adhesives (CS72) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.193 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.829 mg/kg bw/day (ECETOC TRA worker v3)	0.283
combined routes	systemic	long-term		0.286

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

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

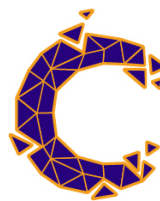
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES9: Consumer use, Use in paint**

**9.1. Title section**

<b>Structured Short Title</b>	: Consumer use
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<b>Environment</b>		
<b>CS1</b>	<b>Consumer use</b>	ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>All application phases regarding water borne paint</b>	PC9a,
<b>CS3</b>	<b>All application phases regarding coatings</b>	PC9a,

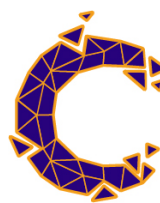
**9.2. Conditions of use affecting exposure**

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

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount per site	: <= 0.088 kg
Maximum daily local emission to waste water	: 0.088 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations

**9.2.2. Control of consumer exposure: Coatings and paints, thinners, paint removers (PC9a) / All application phases regarding water borne paint ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 3750 g/event
Exposure frequency	: 1 events/day
Use frequency	: Infrequent
Duration	: Application duration <= 120 min
Duration	: Dermal exposure duration per event <= 120 min
Duration	: Inhalation exposure duration per event <= 132 min
<b>Other conditions affecting consumers exposure</b>	
Room size	: >= 20 m3



Ventilation rate :  $\geq 0.6$

**9.2.3. Control of consumer exposure: Coatings and paints, thinners, paint removers (PC9a) / All application phases regarding coatings ()**

Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: $\leq 1650$ g/event
Exposure frequency	: 1 events/day
Use frequency	: Infrequent
Duration	: Application duration $\leq 60$ min
Duration	: Inhalation exposure duration per event $\leq 60$ min
Other conditions affecting consumers exposure	
Room size	: $\geq 34$ m <sup>3</sup>
Ventilation rate	: $\geq 1.5$

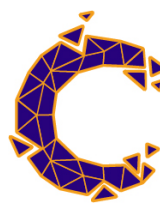
**9.3. Exposure estimation and reference to its source**

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

Compartment	Exposure level	RCR
Freshwater	0.00608 mg/L (EUSES v2.1)	0.03
Freshwater sediment	0.033 mg/kg dry weight (EUSES v2.1)	0.028
Marine water	0.000526 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00283 mg/kg dry weight (EUSES v2.1)	0.024
Sewage treatment plant	0.044 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00967 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000795 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00089 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**9.3.2. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a) / All application phases regarding water borne paint ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR



dermal	systemic	long-term	0.0033 mg/kg bw/day (ConsExpo web 1.1.0)	< 0.01
inhalative	systemic	long-term	0.0053 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	< 0.01
combined routes	systemic	long-term		< 0.01

**9.3.3. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a) / All application phases regarding coatings ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
dermal	systemic	long-term	0.000154 mg/kg bw/day (ConsExpo web 1.1.0)	< 0.01
inhalative	systemic	long-term	0.009 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	< 0.01
combined routes	systemic	long-term		< 0.01

**9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

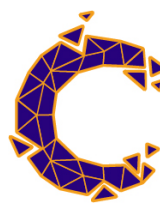
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES10: Formulation or re-packing, Industrial formulation of homecare products**

**10.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing	
<b>Environment</b>		
<b>CS1</b>	<b>Industrial formulation of homecare products</b>	ERC2,
<b>Worker</b>		
<b>CS2</b>	<b>General process exposures, no sampling</b>	PROC1,, CS57
<b>CS3</b>	<b>General process exposures, With sample collection</b>	PROC2,, CS56
<b>CS4</b>	<b>General process exposures</b>	PROC3,
<b>CS5</b>	<b>General exposures open batch process including aerosols</b>	PROC4,
<b>CS6</b>	<b>Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture)</b>	PROC3,
<b>CS7</b>	<b>Sample collection</b>	PROC3,
<b>CS8</b>	<b>Laboratory activities</b>	PROC15, CS36
<b>CS9</b>	<b>Bulk transfers, Drum/batch transfers</b>	PROC8b, CS14, CS8
<b>CS10</b>	<b>Mixing operations (open systems)</b>	PROC5, CS30
<b>CS11</b>	<b>Transfer from/pouring from containers, Manual</b>	PROC8a, CS22, CS34
<b>CS12</b>	<b>Tabletting, compression, extrusion or pelletisation</b>	PROC14
<b>CS13</b>	<b>Drum and small package filling</b>	PROC9, CS6
<b>CS14</b>	<b>Clean down and Maintenance</b>	PROC8a,
<b>CS15</b>	<b>Storage</b>	PROC1,
<b>CS16</b>	<b>Storage</b>	PROC2,

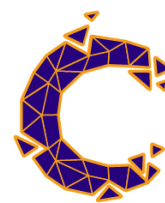
**10.2. Conditions of use affecting exposure**

**10.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation of homecare products ()**

<b>Amount used, frequency and duration of use (or from service life)</b>		
Annual amount per site	:	<= 1269 t
Daily amount per site	:	<= 12.69 t
Maximum daily local emission to waste water	:	1.269 kg
Maximum daily local emission to air	:	317.2 kg
<b>Conditions and measures related to sewage treatment plant</b>		

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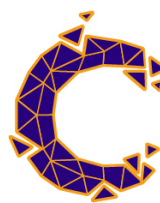


STP type	:	Biological Sewage Treatment Plant
STP sludge treatment	:	Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	:	2,000 m3/d
STP Water - minimum efficiency of 0.255 %		
<b>Conditions and measures related to treatment of waste (including article waste)</b>		
Waste treatment	:	Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18,000 m3/d

**10.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / General process exposures () / no sampling (CS57)**

<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>		
Use frequency	:	Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>		
Avoid direct eye contact with product, also via contamination on hands.		
Avoid splashing.		
Provide a basic standard of general ventilation (1 to 3 air changes per hour).		
without local exhaust ventilation		
Use in closed process, no likelihood of exposure		
Occupational Health and Safety Management System: Advanced.		
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>		
General measures (eye irritants)		
For further specification, refer to section 8 of the SDS.		
<b>Other conditions affecting workers exposure</b>		
Indoor or outdoor use	:	Indoor use
Temperature	:	Assumes process temperature up to 40 °C

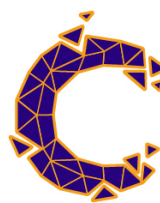
**10.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / with sample collection (CS56)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.4. 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) / General process exposures ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	

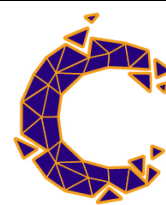


Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures open batch process including aerosols ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

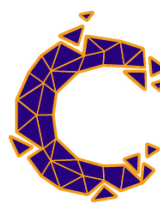
**10.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture) ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 90 %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.7. 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) / Sample collection ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	



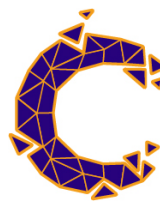
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.8. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity $\leq 1$ h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

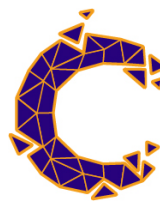
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.10. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) (CS30)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid Aerosol
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	



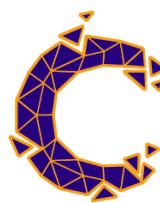
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer from/pouring from containers (CS22) / Manual (CS34)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.12. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)**

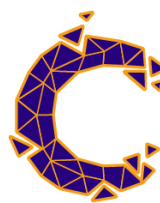
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	



Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Drum and small package filling (CS6)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





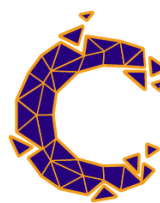
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 3 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**10.2.15. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Storage ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	



Avoid splashing.	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

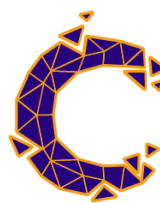
**10.2.16. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

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

**10.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation of homecare products ()**

Compartment	Exposure level	RCR
Freshwater	0.065 mg/L (EUSES v2.1)	0.324



Freshwater sediment	0.348 mg/kg dry weight (EUSES v2.1)	0.295
Marine water	0.00641 mg/L (EUSES v2.1)	0.032
Marine sediment	0.034 mg/kg dry weight (EUSES v2.1)	0.291
Sewage treatment plant	0.633 mg/L (EUSES v2.1)	0.063
Agricultural soil	0.03 mg/kg dry weight (EUSES v2.1)	0.012
Man via environment - Inhalation	0.024 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.058 mg/kg bw/day (EUSES v2.1)	0.012
Man via environment - combined routes		0.013

**10.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / General process exposures () / no sampling (CS57)**

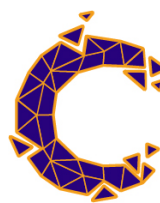
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		< 0.01

**10.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / with sample collection (CS56)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.046

**10.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / General process exposures ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055



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Revision Date 06.12.2023

dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.069

**10.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures open batch process including aerosols ()**

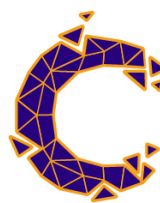
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.146

**10.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.33 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.075

**10.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based	



			on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.041

**10.3.8. Worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.016

**10.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

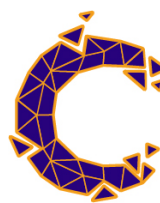
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.279

**10.3.10. Worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) (CS30)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.32

**10.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer from/pouring from containers (CS22) / Manual (CS34)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
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Revision Date 06.12.2023

inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.293

**10.3.12. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)**

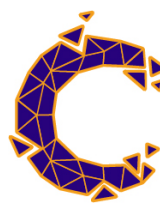
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.114

**10.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Drum and small package filling (CS6)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.183

**10.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	6.608 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.11
dermal	systemic	long-term	0.548 mg/kg bw/day (ECETOC TRA worker v3)	0.055
dermal	local	long-term	(Risk management	



			measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.165

**10.3.15. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00385 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		< 0.01

**10.3.16. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.385 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.143

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

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

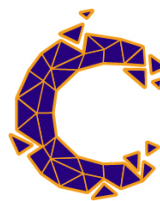
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES11: Widespread use by professional workers, Professional uses as polishes and wax blends**

**11.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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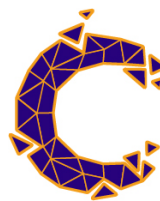
Environment		
<b>CS1</b>	<b>Polishes and wax blends</b>	ERC8a, PC31
Worker		
<b>CS2</b>	<b>Floor care products; polish/impregnating agent</b>	PROC10,
<b>CS3</b>	<b>Floor care products; polish/impregnating agent</b>	PROC11,
<b>CS4</b>	<b>Maintenance products; furniture and leather care products</b>	PROC10,
<b>CS5</b>	<b>Maintenance products; furniture and leather care products</b>	PROC11,
<b>CS6</b>	<b>Maintenance products; leather care product/ Preparatory phase</b>	PROC8a,
<b>CS7</b>	<b>Maintenance products; leather care product/ Use phase</b>	PROC2,
<b>CS8</b>	<b>Maintenance products; drain unblocker</b>	PROC8a,
<b>CS9</b>	<b>Maintenance products; stainless steel care</b>	PROC10,
<b>CS10</b>	<b>Maintenance products; stainless steel care; spray and wipe</b>	PROC11,

**11.2. Conditions of use affecting exposure**

**11.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Polishes and wax blends (PC31)**

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: <= 0.15 kg
Maximum daily local emission to waste water	: 0.15 kg
Conditions and measures related to sewage treatment plant	
STP type	: Biological Sewage Treatment Plant
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.

**11.2.2. Control of worker exposure: Roller application or brushing (PROC10) / Floor care products; polish/impregnating agent ()**

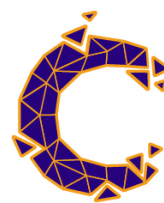




<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.3. Control of worker exposure: Non-industrial spraying (PROC11) / Floor care products; polish/impregnating agent ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 3 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	



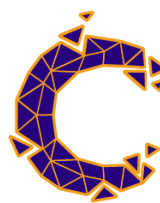
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.4. Control of worker exposure: Roller application or brushing (PROC10) / Maintenance products; furniture and leather care products ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 4 hours/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.5. Control of worker exposure: Non-industrial spraying (PROC11) / Maintenance products; furniture and leather care products ()**

Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity <= 15 min/day
Technical and organisational conditions and measures	

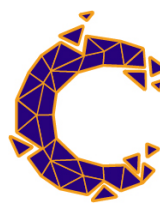


Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance products; leather care product/ Preparatory phase ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

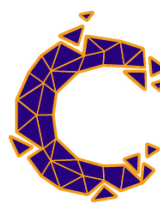
**11.2.7. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Maintenance products; leather care product/ Use phase ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance products; drain unblocker ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	



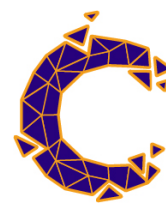
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Inhalation - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.9. Control of worker exposure: Roller application or brushing (PROC10) / Maintenance products; stainless steel care ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 4$ hours/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<b>General measures (eye irritants)</b>	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**11.2.10. Control of worker exposure: Non-industrial spraying (PROC11) / Maintenance products; stainless steel care; spray and wipe ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 4 %	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

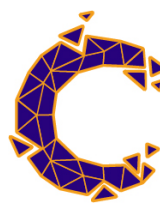
### 11.3. Exposure estimation and reference to its source

#### 11.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Polishes and wax blends (PC31)

Compartment	Exposure level	RCR
Freshwater	0.00897 mg/L (EUSES v2.1)	0.045
Freshwater sediment	0.048 mg/kg dry weight (EUSES v2.1)	0.041
Marine water	0.000825 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00444 mg/kg dry weight (EUSES v2.1)	0.037
Sewage treatment plant	0.075 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00952 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000758 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00087 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 11.3.2. Worker exposure: Roller application or brushing (PROC10) / Floor care products; polish/impregnating agent ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229



**AUGEO® CRYSTAL**

Revision Date 06.12.2023

dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.504

**11.3.3. Worker exposure: Non-industrial spraying (PROC11) / Floor care products; polish/impregnating agent ( )**

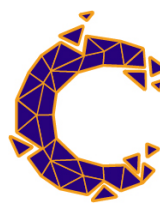
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	0.22 mg/kg bw/day (RISKOFDERM v2.1)	0.022
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.206

**11.3.4. Worker exposure: Roller application or brushing (PROC10) / Maintenance products; furniture and leather care products ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	8.26 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.138
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.412

**11.3.5. Worker exposure: Non-industrial spraying (PROC11) / Maintenance products; furniture and leather care products ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	0.631 mg/kg bw/day (RISKOFDERM v2.1)	0.063
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.247



**11.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance products; leather care product/ Preparatory phase ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.16

**11.3.7. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Maintenance products; leather care product/ Use phase ()**

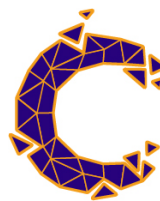
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.018

**11.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance products; drain unblocker ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.138 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.03

**11.3.9. Worker exposure: Roller application or brushing (PROC10) / Maintenance products; stainless steel care ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	8.26 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.138





dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.412

**11.3.10. Worker exposure: Non-industrial spraying (PROC11) / Maintenance products; stainless steel care; spray and wipe**  
( )

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	0.631 mg/kg bw/day (RISKOFDERM v2.1)	0.063
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.247

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

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

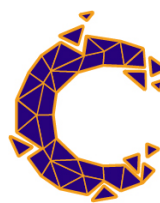
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES12: Widespread use by professional workers, Professional end-use of washing and cleaning products (IFRA GES 4)**

**12.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers	
<b>Environment</b>		
<b>CS1</b>	<b>End-use of washing and cleaning products</b>	ERC8d, ERC8a,
<b>Worker</b>		
<b>CS2</b>	<b>Kitchen cleaners (Use phase)</b>	PROC10,

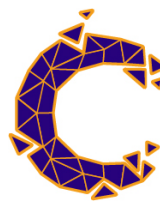
**12.2. Conditions of use affecting exposure**

**12.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-use of washing and cleaning products ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: <= 0.198 kg
Maximum daily local emission to waste water	: 0.198 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Biological Sewage Treatment Plant
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**12.2.2. Control of worker exposure: Roller application or brushing (PROC10) / Kitchen cleaners (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 3 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Scale of application for spreading of liquid to surface	: > 3 m2/h
Use frequency	: Duration of the activity <= 4 hours/day



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Room size	: Any size workroom
Temperature	: Assumes process temperature up to 25 °C

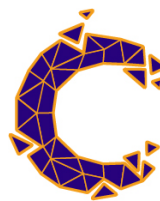
### 12.3. Exposure estimation and reference to its source

#### 12.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-use of washing and cleaning products ()

Compartment	Exposure level	RCR
Freshwater	0.011 mg/L (EUSES v2.1)	0.057
Freshwater sediment	0.061 mg/kg dry weight (EUSES v2.1)	0.052
Marine water	0.00107 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00573 mg/kg dry weight (EUSES v2.1)	0.048
Sewage treatment plant	0.099 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00974 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000759 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000885 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 12.3.2. Worker exposure: Roller application or brushing (PROC10) / Kitchen cleaners (Use phase) ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.5 mg/m <sup>3</sup> (ART v1.5)	0.058



dermal	systemic	long-term	1.097 mg/kg bw/day (ECETOC TRA worker v3)	0.11
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.168

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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

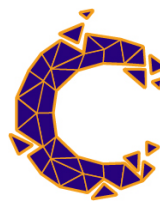
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES13: Consumer use, Consumers end-use of washing and cleaning products (IFRA GES 6)**

**13.1. Title section**

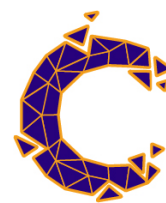
<b>Structured Short Title</b>	: Consumer use	
<b>Environment</b>		
<b>CS1</b>	<b>End-use of washing and cleaning products</b>	ERC8d, ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>Laundry and dish washing products</b>	PC35, PC8_1, PC35_1
<b>CS3</b>	<b>Surface cleaners (liquid)</b>	PC35,
<b>CS4</b>	<b>Toilet cleaners (liquid)</b>	PC35,
<b>CS5</b>	<b>Carpet cleaning (liquids)</b>	PC35,
<b>CS6</b>	<b>Wipes</b>	PC35,
<b>CS7</b>	<b>High pressure washers/cleaners</b>	PC35, AISE-SP-C0021
<b>CS8</b>	<b>Automotive Care Products</b>	PC35, PC6
<b>CS9</b>	<b>Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)</b>	PC35, PC8_3, PC35_3
<b>CS10</b>	<b>Surface care, trigger sprays</b>	PC35,
<b>CS11</b>	<b>Kitchen cleaner, Liquids</b>	PC35,, PC24_1
<b>CS12</b>	<b>Kitchen cleaner, Sprays</b>	PC35,, PC24_3

**13.2. Conditions of use affecting exposure**

**13.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-use of washing and cleaning products ( )**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: <= 0.118 kg
Maximum daily local emission to waste water	: 0.118 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**13.2.2. Control of consumer exposure: Washing and cleaning products (PC35) / Laundry and dish washing products (PC8\_1, PC35\_1)**



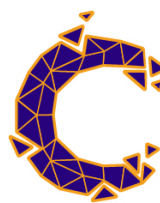
Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: No spray
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 50 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 1 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

### 13.2.3. Control of consumer exposure: Washing and cleaning products (PC35) / Surface cleaners (liquid) ()

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Amount used, frequency and duration of use (or from service life)	
Amount used per event	: <= 60 g
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 0.33 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

### 13.2.4. Control of consumer exposure: Washing and cleaning products (PC35) / Toilet cleaners (liquid) ()

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 55 g/event
Exposure frequency	: 1 events/day
Duration	: Inhalation exposure duration per event <= 7 min
Duration	: Dermal exposure duration per event <= 2 min
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use



Room size	:	>= 2.5 m3
Ventilation rate	:	>= 2

**13.2.5. Control of consumer exposure: Washing and cleaning products (PC35) / Carpet cleaning (liquids) ()**

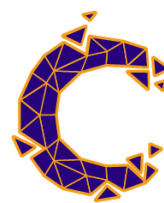
<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 1 %.		
<b>Amount used, frequency and duration of use (or from service life)</b>		
Amount per Application	:	<= 687.5 g/event
Exposure frequency	:	1 events/day
Product amount ingested	:	<= 0.00184 g/event
Duration	:	Application duration <= 30 min
Duration	:	Inhalation exposure duration per event <= 240 min
Duration	:	Dermal exposure duration per event <= 60 min
Use frequency	:	Frequent
<b>Other conditions affecting consumers exposure</b>		
Indoor or outdoor use	:	Indoor use
Room size	:	>= 58 m3
Ventilation rate	:	>= 0.5

**13.2.6. Control of consumer exposure: Washing and cleaning products (PC35) / Wipes ()**

<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 1 %.		
<b>Amount used, frequency and duration of use (or from service life)</b>		
Exposure frequency	:	1 events/day
Use frequency	:	Frequent

**13.2.7. Control of consumer exposure: Washing and cleaning products (PC35) / High pressure washers/cleaners (AISE-SP-C0021)**

<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 1 %.		
Physical form of product	:	Liquid No spray
<b>Amount used, frequency and duration of use (or from service life)</b>		
Amount per Application	:	<= 50 g/event
Exposure frequency	:	1 events/day



Duration	: Duration of exposure by events <= 5 h
Use frequency	: Infrequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

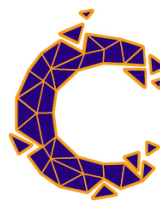
**13.2.8. Control of consumer exposure: Washing and cleaning products (PC35) / Automotive Care Products (PC6)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 5.769 g/event
Exposure frequency	: 1 events/day
Product amount in contact to skin	: <= 0.286 g/event
Duration	: Application duration <= 20 min
Duration	: Inhalation exposure duration per event <= 60 min
Use frequency	: Infrequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use
Room size	: >= 15 m3
Ventilation rate	: >= 2.5

**13.2.9. Control of consumer exposure: Washing and cleaning products (PC35) / Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) (PC8\_3, PC35\_3)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Sprays
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 35 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 4 h
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**13.2.10. Control of consumer exposure: Washing and cleaning products (PC35) / Surface care, trigger sprays ()**





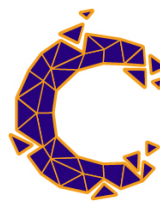
Product (article) characteristics	
Covers the percentage of the substance in the product up to 0,998 %	
Physical form of product	: Sprays
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 35 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 4 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

**13.2.11. Control of consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Liquids (PC24\_1)**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 60 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 0.33 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

**13.2.12. Control of consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Sprays (PC24\_3)**

Product (article) characteristics	
Covers concentrations up to 0.5 %	
Physical form of product	: Sprays
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 35 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 4 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	



Indoor or outdoor use : Indoor use

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

**13.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-use of washing and cleaning products ( )**

Compartment	Exposure level	RCR
Freshwater	0.00741 mg/L (EUSES v2.1)	0.037
Freshwater sediment	0.04 mg/kg dry weight (EUSES v2.1)	0.034
Marine water	0.000668 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00359 mg/kg dry weight (EUSES v2.1)	0.03
Sewage treatment plant	0.059 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00938 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000758 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00086 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**13.3.2. Consumer exposure: Washing and cleaning products (PC35) / Laundry and dish washing products (PC8\_1, PC35\_1)**

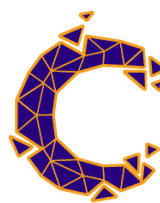
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.384 mg/m <sup>3</sup> (AISE REACT)	0.026
dermal	systemic	long-term	0.763 mg/kg bw/day (AISE REACT)	0.153
combined routes	systemic	long-term		0.178

**13.3.3. Consumer exposure: Washing and cleaning products (PC35) / Surface cleaners (liquid) ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.028 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	1.43 mg/kg bw/day (AISE REACT)	0.286
combined routes	systemic	long-term		0.288

**13.3.4. Consumer exposure: Washing and cleaning products (PC35) / Toilet cleaners (liquid) ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00011 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	< 0.01
dermal	systemic	long-term	0.027 mg/kg bw/day	< 0.01



			(ConsExpo web 1.1.0)	
combined routes	systemic	long-term		< 0.01

**13.3.5. Consumer exposure: Washing and cleaning products (PC35) / Carpet cleaning (liquids) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.0029 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	< 0.01
dermal	systemic	long-term	0.295 mg/kg bw/day (ConsExpo web 1.1.0)	0.059
oral	systemic	long-term	0.033 mg/kg bw/day (ConsExpo web 1.1.0)	< 0.01
combined routes	systemic	long-term		0.066

**13.3.6. Consumer exposure: Washing and cleaning products (PC35) / Wipes ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
dermal	systemic	long-term	1.43 mg/kg bw/day (AISE REACT)	0.286

**13.3.7. Consumer exposure: Washing and cleaning products (PC35) / High pressure washers/cleaners (AISE-SP-C0021)**

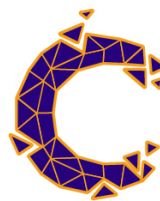
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	6.25 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.417
dermal	systemic	long-term	1.429 mg/kg bw/day (ECETOC TRA consumer v3)	0.286
combined routes	systemic	long-term		0.702

**13.3.8. Consumer exposure: Washing and cleaning products (PC35) / Automotive Care Products (PC6)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.000024 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	< 0.01
dermal	systemic	long-term	0.00164 mg/kg bw/day (ConsExpo web 1.1.0)	< 0.01
combined routes	systemic	long-term		< 0.01

**13.3.9. Consumer exposure: Washing and cleaning products (PC35) / Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) (PC8\_3, PC35\_3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.147 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.343



dermal	systemic	long-term	1.429 mg/kg bw/day (ECETOC TRA consumer v3)	0.286
combined routes	systemic	long-term		0.629

**13.3.10. Consumer exposure: Washing and cleaning products (PC35) / Surface care, trigger sprays ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.137 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.342
dermal	systemic	long-term	1.426 mg/kg bw/day (ECETOC TRA consumer v3)	0.285
combined routes	systemic	long-term		0.628

**13.3.11. Consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Liquids (PC24\_1)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.028 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	1.43 mg/kg bw/day (AISE REACT)	0.286
combined routes	systemic	long-term		0.288

**13.3.12. Consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Sprays (PC24\_3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.574 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.172
dermal	systemic	long-term	0.715 mg/kg bw/day (ECETOC TRA consumer v3)	0.143
combined routes	systemic	long-term		0.314

**13.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

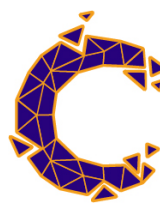
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES14: Consumer use, Consumer end-use of air care products (IFRA GES 7)**

**14.1. Title section**

<b>Structured Short Title</b>	: Consumer use	
<b>Environment</b>		
<b>CS1</b>	<b>End use of air care products</b>	ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>Air fresheners aerosols (aqueous, non-aqueous, concentrated (mini-aerosol) Timed-release aerosols) for consumer use</b>	PC3_1,
<b>CS3</b>	<b>Static room diffuser with rattan sticks</b>	PC3,
<b>CS4</b>	<b>Candles</b>	PC3_2,
<b>CS5</b>	<b>Electric room diffuser</b>	PC3_2,

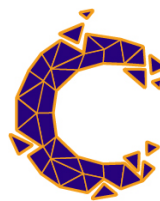
**14.2. Conditions of use affecting exposure**

**14.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of air care products ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: <= 0.652 kg
Maximum daily local emission to waste water	: 0.652 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**14.2.2. Control of consumer exposure: Air care, instant action (aerosol sprays) (PC3\_1) / Air fresheners aerosols (aqueous, non-aqueous, concentrated (mini-aerosol) Timed-release aerosols) for consumer use ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.25 %	
Physical form of product	: Aerosol Sprays
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 10 g/event
Exposure frequency	: 4 events/day
Duration	: Duration of exposure by events 15 min



Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**14.2.3. Control of consumer exposure: Air care products (PC3) / Static room diffuser with rattan sticks ()**

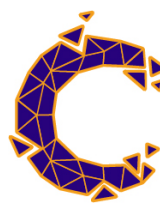
<b>Product (article) characteristics</b>	
Covers concentrations up to 89.8 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 367 g/event
Exposure frequency	: 1 events/day
Product amount in contact to skin	: <= 0.6 g/event
Duration	: Application duration <= 90.3 d
Duration	: Inhalation exposure duration per event <= 90.3 d
Use frequency	: Infrequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use
Room size	: >= 20 m3
Ventilation rate	: >= 0.6

**14.2.4. Control of consumer exposure: Air care, continuous action (solid and liquid) (PC3\_2) / Candles ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 9.98 %	
Physical form of product	: No spray
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 50 g/event
Exposure frequency	: 1 events/day
Duration	: Exposure duration 8 h
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**14.2.5. Control of consumer exposure: Air care, continuous action (solid and liquid) (PC3\_2) / Electric room diffuser ()**

<b>Product (article) characteristics</b>	
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Covers concentrations up to 49.9 %	
Physical form of product	: No spray
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 50 g/event
Exposure frequency	: 1 events/day
Duration	: Exposure duration 8 h
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

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

#### 14.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of air care products ()

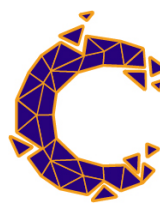
Compartment	Exposure level	RCR
Freshwater	0.034 mg/L (EUSES v2.1)	0.17
Freshwater sediment	0.183 mg/kg dry weight (EUSES v2.1)	0.155
Marine water	0.00333 mg/L (EUSES v2.1)	0.017
Marine sediment	0.018 mg/kg dry weight (EUSES v2.1)	0.151
Sewage treatment plant	0.325 mg/L (EUSES v2.1)	0.033
Agricultural soil	0.012 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000759 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00138 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 14.3.2. Consumer exposure: Air care, instant action (aerosol sprays) (PC3\_1) / Air fresheners aerosols (aqueous, non-aqueous, concentrated (mini-aerosol) Timed-release aerosols) for consumer use ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	4.348 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.29

#### 14.3.3. Consumer exposure: Air care products (PC3) / Static room diffuser with rattan sticks ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.4 mg/m <sup>3</sup> (ConsExpo web 1.1.0)	0.093
dermal	systemic	long-term	0.296 mg/kg bw/day	0.059



			(ConsExpo web 1.1.0)	
oral	systemic	long-term	0.014 mg/kg bw/day (ConsExpo web 1.1.0)	< 0.01
combined routes	systemic	long-term		0.155

**14.3.4. Consumer exposure: Air care, continuous action (solid and liquid) (PC3\_2) / Candles ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	0.059 mg/kg bw/day (ECETOC TRA consumer v3)	0.012
combined routes	systemic	long-term		0.013

**14.3.5. Consumer exposure: Air care, continuous action (solid and liquid) (PC3\_2) / Electric room diffuser ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.057 mg/m <sup>3</sup> (AISE REACT)	< 0.01
dermal	systemic	long-term	0.297 mg/kg bw/day (ECETOC TRA consumer v3)	0.059
combined routes	systemic	long-term		0.063

**14.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

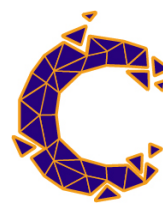
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.





**ES15: Consumer use, Consumers end-use polishes and wax blends (IFRA GES 9)**

**15.1. Title section**

<b>Structured Short Title</b>	: Consumer use
<b>Environment</b>	
<b>CS1</b>	End-uses of polish and wax blends ERC8a,
<b>Consumer</b>	
<b>CS2</b>	Polishes, wax / cream (floor, furniture, shoes) PC31_1
<b>CS3</b>	Polishes, spray (furniture, shoes) PC31, PC23_2, PC31_2

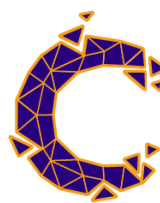
**15.2. Conditions of use affecting exposure**

**15.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-uses of polish and wax blends ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: <= 0.118 kg
Maximum daily local emission to waste water	: 0.118 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**15.2.2. Control of consumer exposure: Polishes, wax / cream (floor, furniture, shoes) (PC31\_1)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.1 %	
Physical form of product	: No spray
<b>Amount used, frequency and duration of use (or from service life)</b>	
Amount per Application	: <= 550 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 4 h
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use



**15.2.3. Control of consumer exposure: Polishes and wax blends (PC31) / Polishes, spray (furniture, shoes) (PC23\_2, PC31\_2)**

Product (article) characteristics	
Covers concentrations up to 0.1 %	
Physical form of product	: Sprays
Amount used, frequency and duration of use (or from service life)	
Amount per Application	: <= 135 g/event
Exposure frequency	: 1 events/day
Duration	: Duration of exposure by events 4 h
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

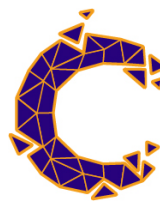
**15.3. Exposure estimation and reference to its source**

**15.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End-uses of polish and wax blends ()**

Compartment	Exposure level	RCR
Freshwater	0.00741 mg/L (EUSES v2.1)	0.037
Freshwater sediment	0.04 mg/kg dry weight (EUSES v2.1)	0.034
Marine water	0.000668 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00359 mg/kg dry weight (EUSES v2.1)	0.03
Sewage treatment plant	0.059 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00938 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000758 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00086 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**15.3.2. Consumer exposure: Polishes, wax / cream (floor, furniture, shoes) (PC31\_1)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	8.088 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.539
dermal	systemic	long-term	0.143 mg/kg bw/day (ECETOC TRA consumer v3)	0.029



combined routes	systemic	long-term		0.568
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**15.3.3. Consumer exposure: Polishes and wax blends (PC31) / Polishes, spray (furniture, shoes) (PC23\_2, PC31\_2)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.985 mg/m <sup>3</sup> (ECETOC TRA consumer v3)	0.132
dermal	systemic	long-term	0.143 mg/kg bw/day (ECETOC TRA consumer v3)	0.029
combined routes	systemic	long-term		0.161

**15.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

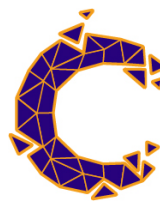
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES16: Formulation or re-packing, Industrial formulation of personal care products**

**16.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing
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Environment		
CS1	Industrial formulation of personal care products	ERC2,
Worker		
CS2	General process exposures, no sampling	PROC1,, CS57
CS3	General process exposures, With sample collection	PROC2,, CS56
CS4	General process exposures	PROC3,
CS5	General exposures open batch process including aerosols	PROC4,
CS6	Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture)	PROC3,
CS7	Sample collection	PROC3,
CS8	Laboratory activities	PROC15, CS36
CS9	Bulk transfers, Drum/batch transfers	PROC8b, CS14, CS8
CS10	Mixing operations (open systems)	PROC5, CS30
CS11	Transfer from/pouring from containers, Manual	PROC8a, CS22, CS34
CS12	Tabletting, compression, extrusion or pelletisation	PROC14
CS13	Drum and small package filling	PROC9, CS6
CS14	Clean down and Maintenance	PROC8a,
CS15	Storage	PROC1,
CS16	Storage	PROC2,

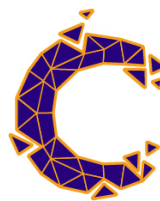
**16.2. Conditions of use affecting exposure**

**16.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation of personal care products ()**

Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: <= 500 t
Daily amount per site	: <= 5 t
Maximum daily local emission to waste water	: 0 kg
Maximum daily local emission to air	: 5 t
Conditions and measures related to sewage treatment plant	

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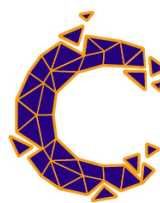


STP type	:	Biological Sewage Treatment Plant
STP sludge treatment	:	Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	:	2,000 m3/d
STP Water - minimum efficiency of 0.255 %		
<b>Conditions and measures related to treatment of waste (including article waste)</b>		
Waste treatment	:	Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18,000 m3/d

**16.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / General process exposures () / no sampling (CS57)**

<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>		
Use frequency	:	Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>		
Avoid direct eye contact with product, also via contamination on hands.		
Avoid splashing.		
Provide a basic standard of general ventilation (1 to 3 air changes per hour).		
without local exhaust ventilation		
Use in closed process, no likelihood of exposure		
Occupational Health and Safety Management System: Advanced.		
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>		
General measures (eye irritants)		
For further specification, refer to section 8 of the SDS.		
<b>Other conditions affecting workers exposure</b>		
Indoor or outdoor use	:	Indoor use
Temperature	:	Assumes process temperature up to 40 °C

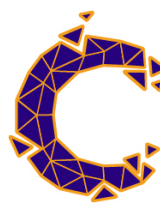
**16.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / with sample collection (CS56)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.4. 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) / General process exposures ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	

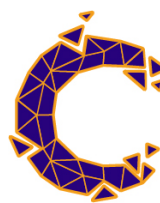


Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures open batch process including aerosols ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

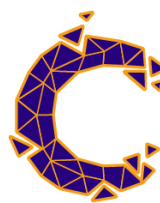
**16.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture) ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 90 %	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.7. 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) / Sample collection ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Closed batch process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	





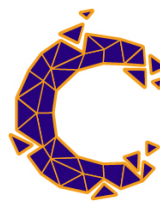
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.8. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity $\leq 1$ h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

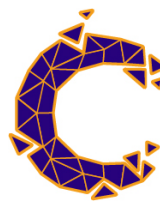
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 95 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.10. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) (CS30)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid Aerosol
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of >= 90 %	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	



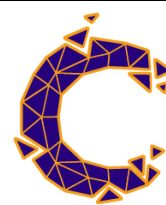
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer from/pouring from containers (CS22) / Manual (CS34)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity $\leq 1$ h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.12. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)**

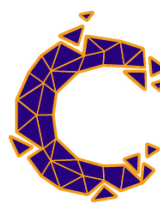
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	



Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Drum and small package filling (CS6)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of $\geq 90\%$	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	



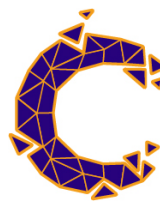
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.8 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
without local exhaust ventilation	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**16.2.15. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Storage ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	



Avoid splashing.	
Use in closed process, no likelihood of exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

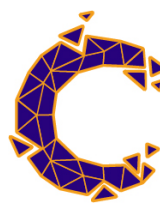
**16.2.16. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity <= 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	
Avoid splashing.	
Closed continuous process with occasional controlled exposure	
Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**16.3. Exposure estimation and reference to its source**

**16.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation of personal care products ()**

Compartment	Exposure level	RCR
Freshwater	0.00151 mg/L (EUSES v2.1)	< 0.01



Freshwater sediment	0.00813 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.0000787 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.000423 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.253 mg/kg dry weight (EUSES v2.1)	0.101
Man via environment - Inhalation	0.381 mg/m <sup>3</sup> (EUSES v2.1)	0.025
Man via environment - Oral	0.903 mg/kg bw/day (EUSES v2.1)	0.181
Man via environment - combined routes		0.206

**16.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / General process exposures () / no sampling (CS57)**

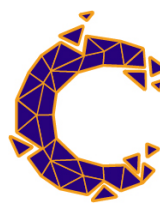
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		< 0.01

**16.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / with sample collection (CS56)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.046

**16.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / General process exposures ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA)	0.055



**AUGEO® CRYSTAL**

Revision Date 06.12.2023

			worker v3)	
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.069

**16.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures open batch process including aerosols ()**

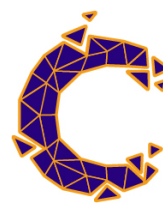
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.146

**16.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Batch processes at elevated temperatures (e.g. solvents resin manufacture, grease manufacture) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.33 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.075

**16.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Sample collection ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.138 mg/kg bw/day (ECETOC TRA worker v3)	0.014
dermal	local	long-term	(Risk management	





			measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.041

**16.3.8. Worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.068 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.016

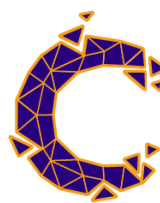
**16.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.279

**16.3.10. Worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) (CS30)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.32

**16.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer from/pouring from containers (CS22) / Manual (CS34)**



**AUGEO® CRYSTAL**

Revision Date 06.12.2023

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.101 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.018
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.293

**16.3.12. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)**

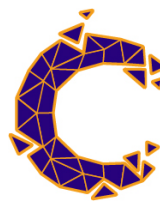
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.114

**16.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Drum and small package filling (CS6)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.183

**16.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.082

**16.3.15. Worker exposure: Use in closed process, no likelihood of exposure (PROC1) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00385 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		< 0.01

**16.3.16. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.385 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
combined routes	systemic	long-term		0.143

**16.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

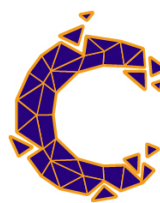
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES17: Formulation or re-packing, Industrial formulation of personal care end-products**

**17.1. Title section**

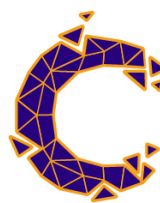
<b>Structured Short Title</b>	: Formulation or re-packing
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Environment		
CS1	Industrial formulation end-products	ERC2,
Worker		
CS2	Uploading/unloading	PROC8b,
CS3	Sampling of received goods	PROC2,
CS4	Quality control of received goods	PROC15,
CS5	Storage	PROC1,
CS6	Closed system mixing including filling process equipment	PROC3,
CS7	Batch mixing with significant contact including filling process	PROC5,
CS8	Maintenance and cleaning	PROC8a,
CS9	Sampling of compounds	PROC2,
CS10	Quality control of compounds	PROC15,
CS11	Charging/discharging from/to vessels/large	PROC8b,
CS12	Transfer in a small containers	PROC9,
CS13	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14

**17.2. Conditions of use affecting exposure**

**17.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation end-products ()**

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 100 %
Daily amount per site	: <= 5 t
Annual amount per site	: <= 500 t
Maximum daily local emission to waste water	: 0 kg
Maximum daily local emission to air	: 5000 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d



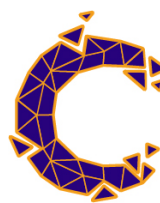
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**17.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day



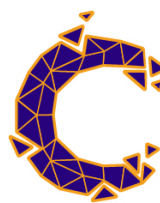
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.4. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.5. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ( )**

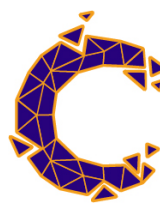
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.6. 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) / Closed system mixing including filling process equipment ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

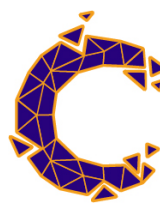


**17.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	





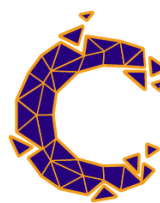
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.9. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.10. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



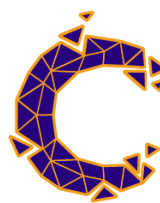
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

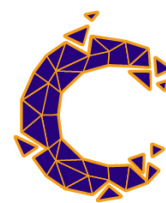
**17.2.13. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**17.3. Exposure estimation and reference to its source**

**17.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation end-products ()**

Compartment	Exposure level	RCR
Freshwater	0.00151 mg/L (EUSES v2.1)	< 0.01



Freshwater sediment	0.00813 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.0000787 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.000423 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.253 mg/kg dry weight (EUSES v2.1)	0.101
Man via environment - Inhalation	0.381 mg/m <sup>3</sup> (EUSES v2.1)	0.025
Man via environment - Oral	0.903 mg/kg bw/day (EUSES v2.1)	0.181
Man via environment - combined routes		0.206

**17.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()**

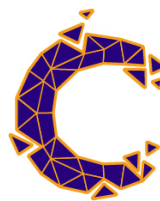
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.33 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.822 mg/kg bw/day (ECETOC TRA worker v3)	0.082
combined routes	systemic	long-term		0.088
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.4. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.204 mg/kg bw/day	0.02



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Revision Date 06.12.2023

			(ECETOC TRA worker v3)	
combined routes	systemic	long-term		0.048
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.5. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00661 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.02 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Closed system mixing including filling process equipment ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.947 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.099
dermal	systemic	long-term	0.414 mg/kg bw/day (ECETOC TRA worker v3)	0.041
combined routes	systemic	long-term		0.141
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

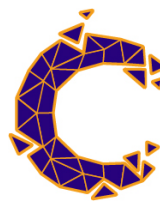
**17.3.7. Worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.165
dermal	local	long-term	(Risk management measures are based	

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213 / 410



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Revision Date 06.12.2023

			on qualitative risk characterisation.)	
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**17.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.192
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.9. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ( )**

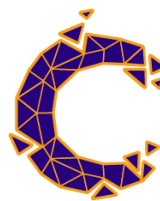
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.015
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.10. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
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inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**17.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.078
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.08
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

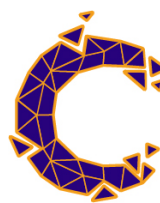
**17.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency



- dilution factor

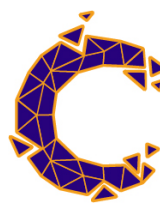
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.





**ES18: Consumer use, End use of cosmetic products**

**18.1. Title section**

<b>Structured Short Title</b>	: Consumer use
-------------------------------	----------------

<b>Environment</b>		
<b>CS1</b>	<b>End use of cosmetic products</b>	ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>End use of cosmetic products</b>	PC39,
<b>CS3</b>	<b>End use of cosmetic products</b>	PC28,

**18.2. Conditions of use affecting exposure**

**18.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of cosmetic products ()**

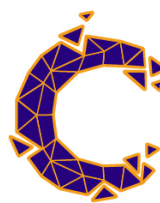
<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide disperse uses	: <= 0.275 kg
Maximum daily local emission to waste water	: 0.275 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**18.2.2. Control of consumer exposure: Cosmetics, personal care products (PC39) / End use of cosmetic products ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
<b>Amount used, frequency and duration of use (or from service life)</b>	
Exposure frequency	: 1 events/day
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**18.2.3. Control of consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()**

<b>Product (article) characteristics</b>
--



Covers percentage substance in the product up to 100 %.	
<b>Amount used, frequency and duration of use (or from service life)</b>	
Exposure frequency	: 1 events/day
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

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

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

Compartment	Exposure level	RCR
Freshwater	0.015 mg/L (EUSES v2.1)	0.076
Freshwater sediment	0.082 mg/kg dry weight (EUSES v2.1)	0.069
Marine water	0.00145 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.0078 mg/kg dry weight (EUSES v2.1)	0.066
Sewage treatment plant	0.137 mg/L (EUSES v2.1)	0.014
Agricultural soil	0.01 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000759 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00091 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 18.3.2. Consumer exposure: Cosmetics, personal care products (PC39) / End use of cosmetic products ()

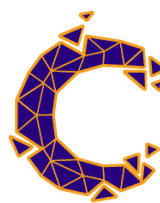
Additional information on exposure estimation
In accordance to the Article 14 (5b) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.

#### 18.3.3. Consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()

Additional information on exposure estimation
In accordance to the Article 14 (5b) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.

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

Environment



If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

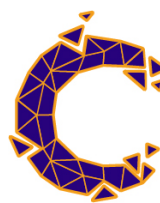
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES19: Formulation or re-packing, Industrial formulation of cosmetics compounds**

**19.1. Title section**

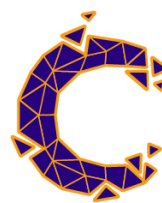
<b>Structured Short Title</b>	: Formulation or re-packing
-------------------------------	-----------------------------

Environment		
CS1	Formulation	ERC2, SU 10
Worker		
CS2	Uploading/unloading	PROC8b,
CS3	Sampling of received goods	PROC2,
CS4	Quality control of received goods	PROC15,
CS5	Storage	PROC1,
CS6	Closed system mixing including filling process equipment	PROC3,
CS7	Batch mixing with significant contact including filling process	PROC5,
CS8	Maintenance and cleaning	PROC8a,
CS9	Sampling of compounds	PROC2,
CS10	Quality control of compounds	PROC15,
CS11	Charging/discharging from/to vessels/large	PROC8b,
CS12	Transfer in a small containers	PROC9,

**19.2. Conditions of use affecting exposure**

**19.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation (SU 10)**

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 100 %
Daily amount per site	: <= 1.8 t
Annual amount per site	: <= 360 t
Emission Days (days/year):	: >= 200
Maximum daily local emission to waste water	: 3.6 kg
Maximum daily local emission to air	: 45 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP	



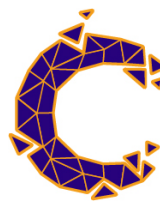
Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**19.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.8 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	



Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Closed continuous process with occasional controlled exposure  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

**19.2.4. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ()**

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Use frequency : Duration of the activity 15 min/day

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

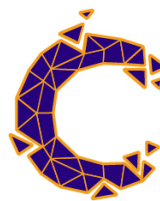
**19.2.5. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ()**

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

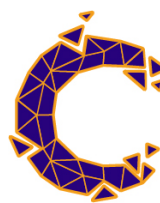


Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
<p>Avoid direct eye contact with product, also via contamination on hands.                  Avoid splashing.                  Provide a basic standard of general ventilation (1 to 3 air changes per hour).                  Use in closed process, no likelihood of exposure                  Occupational Health and Safety Management System: Advanced.</p>	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<p>General measures (eye irritants)                  For further specification, refer to section 8 of the SDS.</p>	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.6. 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) / Closed system mixing including filling process equipment ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
<p>Avoid direct eye contact with product, also via contamination on hands.                  Avoid splashing.                  Provide a basic standard of general ventilation (1 to 3 air changes per hour).                  Occupational Health and Safety Management System: Advanced.                  Closed batch process with occasional controlled exposure</p>	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
<p>General measures (eye irritants)                  For further specification, refer to section 8 of the SDS.</p>	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

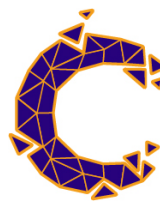
**19.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**



<b>Product (article) characteristics</b>	
Covers concentrations up to 0.8 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.8 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use





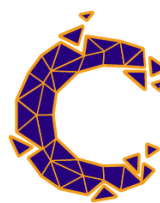
Temperature	: Assumes process temperature up to 40 °C
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**19.2.9. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.10. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	



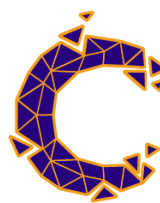
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

Product (article) characteristics	
Covers concentrations up to 0.8 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**19.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 19.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation (SU 10)

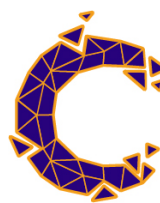
Compartment	Exposure level	RCR
Freshwater	0.181 mg/L (EUSES v2.1)	0.905
Freshwater sediment	0.974 mg/kg dry weight (EUSES v2.1)	0.823
Marine water	0.018 mg/L (EUSES v2.1)	0.09
Marine sediment	0.097 mg/kg dry weight (EUSES v2.1)	0.82
Sewage treatment plant	1.795 mg/L (EUSES v2.1)	0.18
Agricultural soil	0.029 mg/kg dry weight (EUSES v2.1)	0.012
Man via environment - Inhalation	0.00693 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.02 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 19.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

#### 19.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
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**AUGEO® CRYSTAL**

Revision Date 06.12.2023

inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.4. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ()**

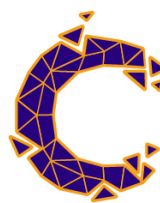
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.08
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.5. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Closed system mixing including filling process equipment ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.912 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.165
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069



combined routes	systemic	long-term		0.234
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.7. Worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

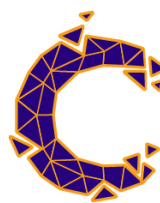
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.165
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.192
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.9. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.33 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.822 mg/kg bw/day (ECETOC TRA worker v3)	0.082
combined routes	systemic	long-term		0.088
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



**19.3.10. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.625 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.204 mg/kg bw/day (ECETOC TRA worker v3)	0.02
combined routes	systemic	long-term		0.048
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**19.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	4.116 mg/kg bw/day (ECETOC TRA worker v3)	0.412
combined routes	systemic	long-term		0.467
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

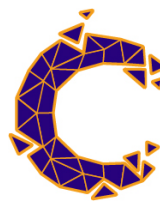
**19.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)



- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

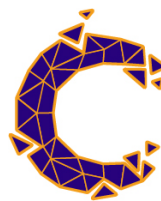
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

#### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES20: Formulation or re-packing, Industrial, Formulation of fragranced end-products (IFRA GES 2)**

**20.1. Title section**

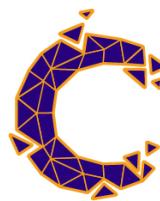
<b>Structured Short Title</b>	: Formulation or re-packing
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Environment		
CS1	Industrial formulation end-products	ERC2,
Worker		
CS2	Uploading/unloading	PROC8b,
CS3	Sampling of received goods	PROC2,
CS4	Quality control of received goods	PROC15,
CS5	Storage	PROC1,
CS6	Closed system mixing including filling process equipment	PROC3,
CS7	Batch mixing with significant contact including filling process	PROC5,
CS8	Maintenance and cleaning	PROC8a,
CS9	Sampling of compounds	PROC2,
CS10	Quality control of compounds	PROC15,
CS11	Charging/discharging from/to vessels/large	PROC8b,
CS12	Transfer in a small containers	PROC9,
CS13	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14

**20.2. Conditions of use affecting exposure**

**20.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation end-products ()**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 1.186 t
Fraction of EU tonnage used in region:	: 100 %
Annual amount per site	: <= 1190 t
Emission Days (days/year):	: >= 250
Maximum daily local emission to waste water	: 2.372 kg
Maximum daily local emission to air	: 29.65 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes





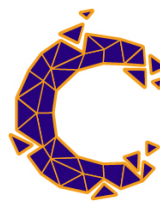
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**20.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day



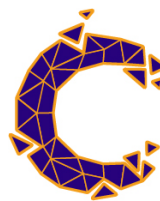
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.4. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.5. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ()**

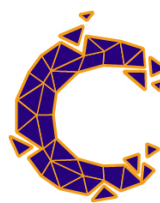
Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.6. 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) / Closed system mixing including filling process equipment ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

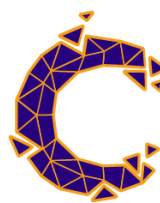


**20.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	



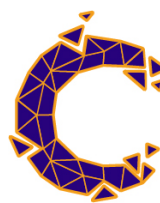
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.9. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.10. Control of worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



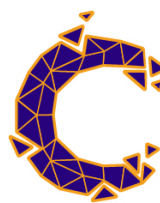
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day



<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

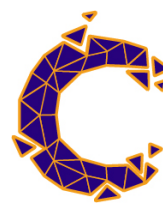
**20.2.13. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**20.3. Exposure estimation and reference to its source**

**20.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation end-products ()**

Compartment	Exposure level	RCR
Freshwater	0.12 mg/L (EUSES v2.1)	0.599



Freshwater sediment	0.644 mg/kg dry weight (EUSES v2.1)	0.545
Marine water	0.012 mg/L (EUSES v2.1)	0.06
Marine sediment	0.064 mg/kg dry weight (EUSES v2.1)	0.541
Sewage treatment plant	1.183 mg/L (EUSES v2.1)	0.118
Agricultural soil	0.034 mg/kg dry weight (EUSES v2.1)	0.014
Man via environment - Inhalation	0.023 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.063 mg/kg bw/day (EUSES v2.1)	0.013
Man via environment - combined routes		0.014

**20.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Uploading/unloading ()**

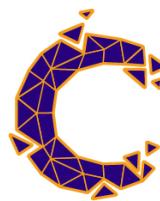
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of received goods ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.015
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.4. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of received goods ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day	< 0.01





			(ECETOC TRA worker v3)	
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.5. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage ()**

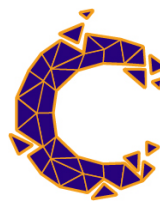
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.0011 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Closed system mixing including filling process equipment ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.991 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.017
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.023
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.7. Worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.165
dermal	local	long-term	(Risk management measures are based	



			on qualitative risk characterisation.)	
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**20.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Maintenance and cleaning ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.192
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.9. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Sampling of compounds ( )**

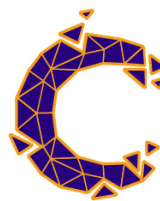
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.015
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.10. Worker exposure: Use as laboratory reagent (PROC15) / Quality control of compounds ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
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inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**20.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.078
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.08
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

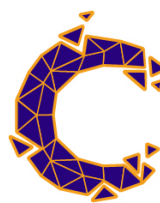
**20.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor



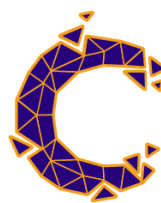
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

#### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES21: Formulation or re-packing, Formulation of fragrance compounds (IFRA GES 1)**

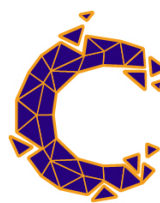
**21.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing	
<b>Environment</b>		
<b>CS1</b>	<b>Formulation of fragrance compounds (IFRA GES 1)</b>	ERC2,
<b>Worker</b>		
<b>CS2</b>	<b>Material transfers from/to vessel/container at dedicated facility (IFRA F-1)</b>	PROC8b, CS1
<b>CS3</b>	<b>Storage (IFRA F-2)</b>	PROC1, CS2
<b>CS4</b>	<b>Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3)</b>	PROC3, CS3
<b>CS5</b>	<b>Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4)</b>	PROC5, CS4
<b>CS6</b>	<b>QC laboratory (IFRA F-5)</b>	PROC15, CS5
<b>CS7</b>	<b>Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6)</b>	PROC9, CS6
<b>CS8</b>	<b>Equipment cleaning and maintenance (IFRA F-7)</b>	PROC8a, CS7

**21.2. Conditions of use affecting exposure**

**21.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation of fragrance compounds (IFRA GES 1) ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount per site	: <= 0.507 t
Annual amount per site	: <= 507 t
Emission Days (days/year):	: >= 250
Maximum daily local emission to waste water	: 1.014 kg
Maximum daily local emission to air	: 12.67 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	



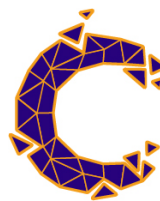
Waste treatment	: Particular considerations on the waste treatment operations
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**21.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Material transfers from/to vessel/container at dedicated facility (IFRA F-1) (CS1)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**21.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (IFRA F-2) (CS2)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



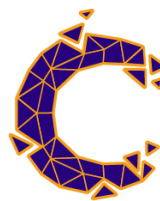
Temperature	: Assumes process temperature up to 40 °C
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**21.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3) (CS3)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**21.2.5. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4) (CS4)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	



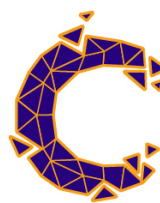
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**21.2.6. Control of worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (IFRA F-5) (CS5)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**21.2.7. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6) (CS6)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

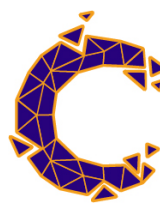
**21.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Equipment cleaning and maintenance (IFRA F-7) (CS7)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**21.3. Exposure estimation and reference to its source**

**21.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation of fragrance compounds (IFRA GES 1) ()**

Compartment	Exposure level	RCR
Freshwater	0.052 mg/L (EUSES v2.1)	0.26
Freshwater sediment	0.28 mg/kg dry weight (EUSES v2.1)	0.237
Marine water	0.00514 mg/L (EUSES v2.1)	0.026
Marine sediment	0.028 mg/kg dry weight (EUSES v2.1)	0.233
Sewage treatment plant	0.506 mg/L (EUSES v2.1)	0.051
Agricultural soil	0.02 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.00973 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.027 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01



**21.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Material transfers from/to vessel/container at dedicated facility (IFRA F-1) (CS1)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.146
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (IFRA F-2) (CS2)**

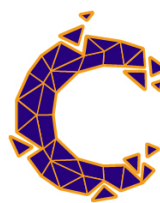
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3) (CS3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.991 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.017
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.023
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.5. Worker exposure: Mixing or blending in batch processes (PROC5) / Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4) (CS4)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA)	0.028



			worker v3)	
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.165
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.6. Worker exposure: Use as laboratory reagent (PROC15) / QC laboratory (IFRA F-5) (CS5)**

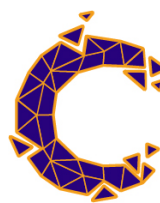
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6) (CS6)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.078
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**21.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Equipment cleaning and maintenance (IFRA F-7) (CS7)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.192



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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#### 21.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

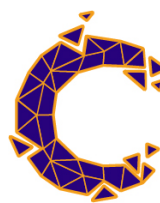
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

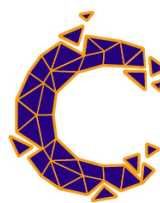


**ES22: Widespread use by professional workers, Professional uses, end-products**

**22.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
CS1	Professional end-use of washing and cleaning products (IFRA GES 4)	ERC8d,
Worker		
CS2	The use as fragrance solvent in various products (detergents, laundry products, dishwash products, kitchen cleaners, medical devices)	PROC8a,
CS3	Use of detergent and conditioners	PROC8a,
CS4	The use as fragrance solvent in various products (general purpose cleaners, laundry products, floor and carpet cleaners)	PROC8a,
CS5	The use as fragrance solvent in various products (laundry products, dishwash products, kitchen and drain cleaners)	PROC8a,
CS6	Prespotter/stain remover	PROC11,
CS7	Dishwash products (Use phase)	PROC10,
CS8	Dishwash and rinse products (Preparatory phase)	PROC8b,
CS9	Dishwash and rinse products (Use phase)	PROC2,
CS10	The use as fragrance solvent in various products	PROC10,
CS11	General purpose cleaner, spray and wipe (Use phase)	PROC11,
CS12	Kitchen cleaners (Use phase)	PROC10,
CS13	The use as fragrance solvent in various products	PROC11,
CS14	Descaling agent	PROC13,
CS15	Oven, grill cleaner	PROC10,
CS16	Floor cleaners (Preparatory phase)	PROC8a,
CS17	Floor cleaners, spray and wipe (Use phase)	PROC11,
CS18	The use as fragrance solvent in various products	PROC8a,
CS19	Car wash and dewaxing products (Use phase)	PROC4,
CS20	Spray and rinse process (Use phase)	PROC11,
CS21	Boat cleaners (Use process)	PROC10,
CS22	Surface cleaner: high and medium pressure (Preparatory phase)	PROC8a,
CS23	Surface cleaner: high and medium pressure (Use phase)	PROC11,
CS24	Medical devices (Preparatory process)	PROC8a,
CS25	Medical devices (Use phase)	PROC4,
CS26	Medical devices: dipping process (Preparatory process)	PROC8a,
CS27	Medical devices: dipping process (Use phase)	PROC13,
CS28	The use as fragrance solvent in various products	PROC11,



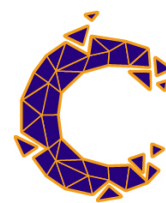
## 22.2. Conditions of use affecting exposure

### 22.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Professional end-use of washing and cleaning products (IFRA GES 4) ()

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide disperse uses	: 0.198 kg
Maximum daily local emission to waste water	: 0.198 kg
Conditions and measures related to sewage treatment plant	
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.

### 22.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (detergents, laundry products, dishwash products, kitchen cleaners, medical devices) ()

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80$ % For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

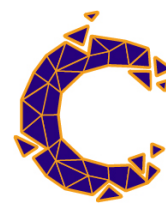


**22.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Use of detergent and conditioners ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.4. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (general purpose cleaners, laundry products, floor and carpet cleaners) ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. Wear suitable gloves tested to EN374.	



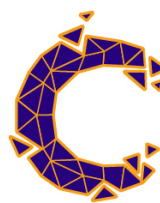
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (laundry products, dishwash products, kitchen and drain cleaners) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.6. Control of worker exposure: Non-industrial spraying (PROC11) / Prespotter/stain remover ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
Very low application rate (< 0.03 l/minute)	
<b>Technical and organisational conditions and measures</b>	



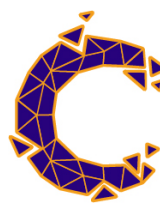


Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$ For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Room size	: Any size workroom
Temperature	: Assumes process temperature up to 25 °C
Distance from the worker to the emission source < 1 m	

**22.2.7. Control of worker exposure: Roller application or brushing (PROC10) / Dishwash products (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$ For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

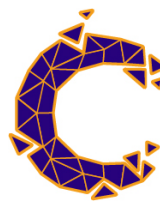
**22.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Dishwash and rinse products (Preparatory phase) ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.9. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Dishwash and rinse products (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	



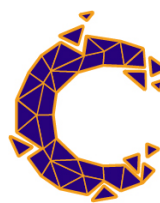
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.10. Control of worker exposure: Roller application or brushing (PROC10) / The use as fragrance solvent in various products ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.11. Control of worker exposure: Non-industrial spraying (PROC11) / General purpose cleaner, spray and wipe (Use phase) ()**

Product (article) characteristics	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Low application rate (0.03 - 0.3 l/minute)	
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing.	



Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Basic.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Dermal - minimum efficiency of  $\geq 90\%$

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use

Room size : Any size workroom

Temperature : Assumes process temperature up to 25 °C

Distance from the worker to the emission source < 1 m

**22.2.12. Control of worker exposure: Roller application or brushing (PROC10) / Kitchen cleaners (Use phase) ( )**

**Product (article) characteristics**

Covers concentrations up to 15 %

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Scale of application for spreading of liquid to surface : > 3 m<sup>2</sup>/h

Use frequency : Duration of the activity 4 h/day

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Basic.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

Use suitable eye protection.

Wear suitable gloves tested to EN374.

Dermal - minimum efficiency of  $\geq 80\%$

For further specification, refer to section 8 of the SDS.

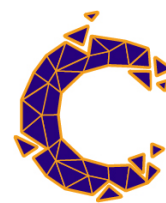
**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use

Room size : Any size workroom

Temperature : Assumes process temperature up to 25 °C

Distance from the worker to the emission source < 1 m

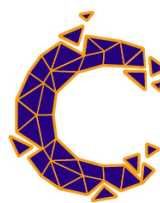


**22.2.13. Control of worker exposure: Non-industrial spraying (PROC11) / The use as fragrance solvent in various products ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.14. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Descaling agent ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	



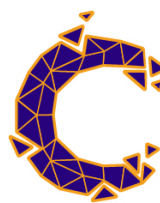
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.15. Control of worker exposure: Roller application or brushing (PROC10) / Oven, grill cleaner ( )**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Floor cleaners (Preparatory phase) ( )**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands.	

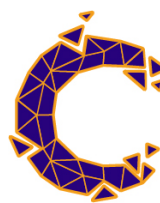


Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.17. Control of worker exposure: Non-industrial spraying (PROC11) / Floor cleaners, spray and wipe (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
Low application rate (0.03 - 0.3 l/minute)	
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic. Segregation of the source: No segregation	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Room size	: Any size workroom
Temperature	: Assumes process temperature up to 25 °C

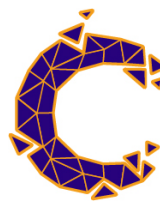
**22.2.18. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products ()**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.19. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Car wash and dewaxing products (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	





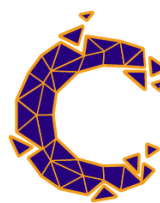
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.20. Control of worker exposure: Non-industrial spraying (PROC11) / Spray and rinse process (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
Moderate application rate (0.3 - 3 l/minute)	
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic. No containment	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 25 °C
Distance from the worker to the emission source < 1 m	

**22.2.21. Control of worker exposure: Roller application or brushing (PROC10) / Boat cleaners (Use process) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Scale of application for spreading of liquid to surface	: > 3 m <sup>2</sup> /h
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing.	



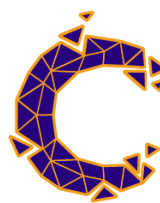
Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 25 °C
Distance from the worker to the emission source < 1 m	

**22.2.22. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Surface cleaner: high and medium pressure (Preparatory phase) ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 0.25 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.23. Control of worker exposure: Non-industrial spraying (PROC11) / Surface cleaner: high and medium pressure (Use phase) ()**

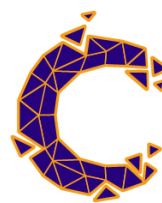
<b>Product (article) characteristics</b>	
Covers concentrations up to 15 %	



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
Moderate application rate (0.3 - 3 l/minute)	
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
Wear suitable respiratory protection. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.24. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Medical devices (Preparatory process) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Local exhaust ventilation Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 80 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	



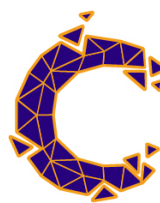
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.25. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Medical devices (Use phase) ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 4 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Local exhaust ventilation Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 80 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.26. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Medical devices: dipping process (Preparatory process) ()**

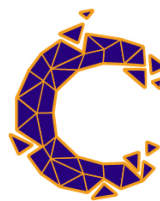
Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day



<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Local exhaust ventilation Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 80 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.2.27. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) / Medical devices: dipping process (Use phase) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Local exhaust ventilation Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 80 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



Temperature : Assumes process temperature up to 40 °C

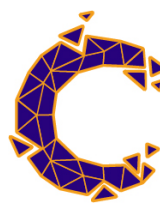
**22.2.28. Control of worker exposure: Non-industrial spraying (PROC11) / The use as fragrance solvent in various products ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 % For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**22.3. Exposure estimation and reference to its source**

**22.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Professional end-use of washing and cleaning products (IFRA GES 4) ()**

Compartment	Exposure level	RCR
Freshwater	0.011 mg/L (EUSES v2.1)	0.057
Freshwater sediment	0.061 mg/kg dry weight (EUSES v2.1)	0.052
Marine water	0.00107 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00573 mg/kg dry weight (EUSES v2.1)	0.048
Sewage treatment plant	0.099 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00974 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000759 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000885 mg/kg bw/day (EUSES v2.1)	< 0.01



	v2.1)	
Man via environment - combined routes		< 0.01

**22.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (detergents, laundry products, dishwash products, kitchen cleaners, medical devices) ()**

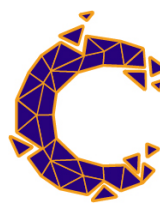
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
combined routes	systemic	long-term		0.05
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Use of detergent and conditioners ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.367
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.4. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (general purpose cleaners, laundry products, floor and carpet cleaners) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
combined routes	systemic	long-term		0.073
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



**22.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products (laundry products, dishwash products, kitchen and drain cleaners) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.377 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.023
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.16
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.6. Worker exposure: Non-industrial spraying (PROC11) / Prespotter/stain remover ()**

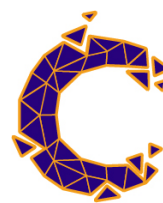
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	4.3 mg/m <sup>3</sup> (ART v1.5)	0.072
dermal	systemic	long-term	6.428 mg/kg bw/day (ECETOC TRA worker v3)	0.643
combined routes	systemic	long-term		0.715
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.7. Worker exposure: Roller application or brushing (PROC10) / Dishwash products (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	0.549 mg/kg bw/day (ECETOC TRA worker v3)	0.055
combined routes	systemic	long-term		0.284
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Dishwash and rinse products (Preparatory phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027





combined routes	systemic	long-term		0.037
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.9. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Dishwash and rinse products (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.018
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.10. Worker exposure: Roller application or brushing (PROC10) / The use as fragrance solvent in various products ()**

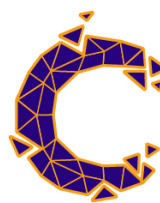
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.504
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.11. Worker exposure: Non-industrial spraying (PROC11) / General purpose cleaner, spray and wipe (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.2 mg/m <sup>3</sup> (ART v1.5)	0.053
dermal	systemic	long-term	6.428 mg/kg bw/day (ECETOC TRA worker v3)	0.643
combined routes	systemic	long-term		0.696
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.12. Worker exposure: Roller application or brushing (PROC10) / Kitchen cleaners (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
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**AUGEO® CRYSTAL**

Revision Date 06.12.2023

inhalative	systemic	long-term	17 mg/m <sup>3</sup> (ART v1.5)	0.283
dermal	systemic	long-term	3.292 mg/kg bw/day (ECETOC TRA worker v3)	0.329
combined routes	systemic	long-term		0.612
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.13. Worker exposure: Non-industrial spraying (PROC11) / The use as fragrance solvent in various products ()**

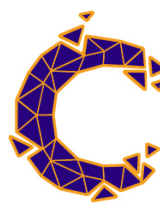
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.143 mg/kg bw/day (ECETOC TRA worker v3)	0.214
combined routes	systemic	long-term		0.306
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.14. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Descaling agent ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	6.608 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.11
dermal	systemic	long-term	1.645 mg/kg bw/day (ECETOC TRA worker v3)	0.165
combined routes	systemic	long-term		0.275
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.15. Worker exposure: Roller application or brushing (PROC10) / Oven, grill cleaner ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	3.292 mg/kg bw/day (ECETOC TRA worker v3)	0.329
combined routes	systemic	long-term		0.604
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



			characterisation.)	
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**22.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Floor cleaners (Preparatory phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	1.645 mg/kg bw/day (ECETOC TRA worker v3)	0.165
combined routes	systemic	long-term		0.44
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.17. Worker exposure: Non-industrial spraying (PROC11) / Floor cleaners, spray and wipe (Use phase) ()**

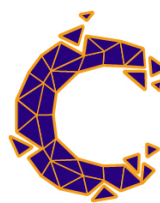
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.1 mg/m <sup>3</sup> (ART v1.5)	0.018
dermal	systemic	long-term	6.428 mg/kg bw/day (ECETOC TRA worker v3)	0.643
combined routes	systemic	long-term		0.661
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.18. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	0.274 mg/kg bw/day (ECETOC TRA worker v3)	0.027
combined routes	systemic	long-term		0.06
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.19. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Car wash and dewaxing products (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	23.12 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.385



**AUGEO® CRYSTAL**

Revision Date 06.12.2023

dermal	systemic	long-term	0.823 mg/kg bw/day (ECETOC TRA worker v3)	0.082
combined routes	systemic	long-term		0.468
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.20. Worker exposure: Non-industrial spraying (PROC11) / Spray and rinse process (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	4.9 mg/m <sup>3</sup> (ART v1.5)	0.082
dermal	systemic	long-term	6.428 mg/kg bw/day (ECETOC TRA worker v3)	0.643
combined routes	systemic	long-term		0.725
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

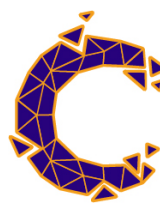
**22.3.21. Worker exposure: Roller application or brushing (PROC10) / Boat cleaners (Use process) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.9 mg/m <sup>3</sup> (ART v1.5)	0.065
dermal	systemic	long-term	3.292 mg/kg bw/day (ECETOC TRA worker v3)	0.329
combined routes	systemic	long-term		0.394
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.22. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Surface cleaner: high and medium pressure (Preparatory phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.782 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.096
dermal	systemic	long-term	1.645 mg/kg bw/day (ECETOC TRA worker v3)	0.165
combined routes	systemic	long-term		0.261
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.23. Worker exposure: Non-industrial spraying (PROC11) / Surface cleaner: high and medium pressure (Use phase) ()**



**AUGEO® CRYSTAL**

Revision Date 06.12.2023

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	23.12 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.385
dermal	systemic	long-term	3.275 mg/kg bw/day (RISKOFDERM v2.1)	0.328
combined routes	systemic	long-term		0.713
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.24. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Medical devices (Preparatory process) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.055 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.015
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.25. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Medical devices (Use phase) ()**

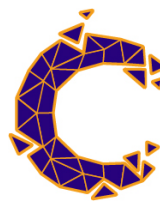
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.661 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.011
dermal	systemic	long-term	0.027 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.014
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.26. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Medical devices: dipping process (Preparatory process) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.275 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.055 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01

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combined routes	systemic	long-term		0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.27. Worker exposure: Treatment of articles by dipping and pouring (PROC13) / Medical devices: dipping process (Use phase) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.661 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.011
dermal	systemic	long-term	0.055 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.016
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.3.28. Worker exposure: Non-industrial spraying (PROC11) / The use as fragrance solvent in various products ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.143 mg/kg bw/day (ECETOC TRA worker v3)	0.214
combined routes	systemic	long-term		0.306
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**22.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

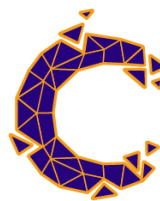
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES23: Consumer use, End use of cosmetic products**

**23.1. Title section**

<b>Structured Short Title</b>	: Consumer use
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<b>Environment</b>		
<b>CS1</b>	<b>End use of cosmetic products</b>	ERC8a,
<b>Consumer</b>		
<b>CS2</b>	<b>End use of cosmetic products</b>	PC39,
<b>CS3</b>	<b>End use of cosmetic products</b>	PC28,

**23.2. Conditions of use affecting exposure**

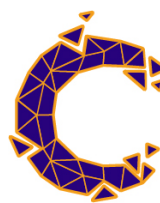
**23.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / End use of cosmetic products ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide disperse uses	: <= 0.198 kg
Maximum daily local emission to waste water	: 0.198 kg
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**23.2.2. Control of consumer exposure: Cosmetics, personal care products (PC39) / End use of cosmetic products ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: No spray
<b>Amount used, frequency and duration of use (or from service life)</b>	
Exposure frequency	: 1 events/day
Use frequency	: Frequent
<b>Other conditions affecting consumers exposure</b>	
Indoor or outdoor use	: Indoor use

**23.2.3. Control of consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()**



Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Amount used, frequency and duration of use (or from service life)	
Exposure frequency	: 1 events/day
Use frequency	: Frequent
Other conditions affecting consumers exposure	
Indoor or outdoor use	: Indoor use

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

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

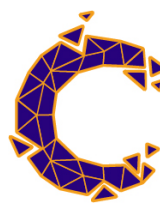
Compartment	Exposure level	RCR
Freshwater	0.011 mg/L (EUSES v2.1)	0.057
Freshwater sediment	0.061 mg/kg dry weight (EUSES v2.1)	0.052
Marine water	0.00107 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00573 mg/kg dry weight (EUSES v2.1)	0.048
Sewage treatment plant	0.099 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00974 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000759 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000885 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 23.3.2. Consumer exposure: Cosmetics, personal care products (PC39) / End use of cosmetic products ()

Additional information on exposure estimation
In accordance to the Article 14 (5b) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.

#### 23.3.3. Consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()

Additional information on exposure estimation
In accordance to the Article 14 (5b) of the REACH Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.





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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

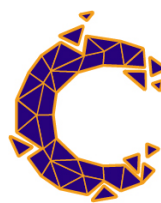
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES24: Formulation or re-packing, Formulation of fuel additives and fuel blends**

**24.1. Title section**

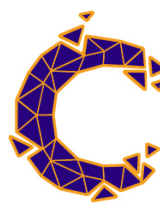
<b>Structured Short Title</b>	: Formulation or re-packing
-------------------------------	-----------------------------

Environment		
CS1	Formulation of fuel additives and fuel blends	ERC2,
Worker		
CS2	Use in closed process, no likelihood of exposure	PROC1
CS3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS4	Blending and filling processes (closed/dedicated), including both bulk and small quantity additions	PROC3,
CS5	Use in batch and other process (synthesis) where opportunity for exposure arises, during charging and sampling	PROC4,
CS6	Use in batch and other process (synthesis) where opportunity for exposure arises, during charging and sampling	PROC5,
CS7	Sample collection of formulation	PROC4,
CS8	Sample collection of formulation	PROC5,
CS9	Sample collection of incoming raw materials	PROC8b,
CS10	Bulk transfer by fixed pipe or flexible hose	PROC8b,
CS11	Small pack (drum/bag) transfers at dedicated facility	PROC8b,
CS12	Small pack (drum/bag) transfers at non-dedicated facility	PROC8a,
CS13	Maintenance and cleaning	PROC8b,
CS14	Top filling of bulk containers (e.g. road cars)	PROC8b,
CS15	Filling of drum and small packages	PROC9,
CS16	Laboratory use: QC laboratory use	PROC15

**24.2. Conditions of use affecting exposure**

**24.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation of fuel additives and fuel blends ()**

Amount used, frequency and duration of use (or from service life)		
Daily amount per site	:	<= 100 kg
Annual amount per site	:	<= 1 t
Emission Days (days/year):	:	>= 200
Maximum daily local emission to waste water	:	2 kg
Maximum daily local emission to air	:	2.5 kg



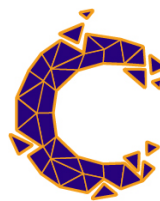
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**24.2.2. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

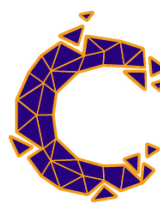
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.4. 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) / Blending and filling processes (closed/dedicated), including both bulk and small quantity additions ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

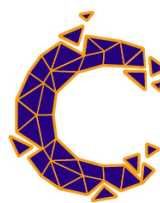


**24.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4) / during charging and sampling ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5) / during charging and sampling ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	



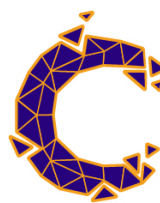
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Sample collection of formulation ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.8. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Sample collection of formulation ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



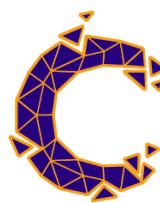
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Sample collection of incoming raw materials ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfer by fixed pipe or flexible hose ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours



**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Use suitable eye protection.  
For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

**24.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Small pack (drum/bag) transfers at dedicated facility ()**

**Product (article) characteristics**

Covers percentage substance in the product up to 1 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Use suitable eye protection.  
For further specification, refer to section 8 of the SDS.

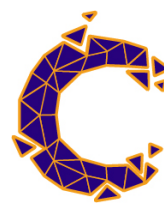
**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

**24.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Small pack (drum/bag) transfers at non-dedicated facility ()**

**Product (article) characteristics**

Covers percentage substance in the product up to 1 %.

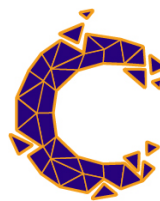




Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance and cleaning ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

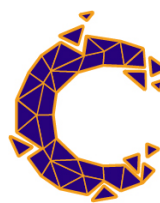


**24.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Top filling of bulk containers (e.g. road cars) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**24.2.15. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Filling of drum and small packages ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	



Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

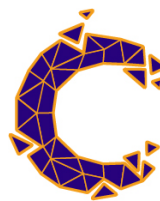
#### 24.2.16. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

##### 24.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation of fuel additives and fuel blends ()

Compartment	Exposure level	RCR
Freshwater	0.101 mg/L (EUSES v2.1)	0.506
Freshwater sediment	0.545 mg/kg dry weight (EUSES v2.1)	0.46
Marine water	0.01 mg/L (EUSES v2.1)	0.05
Marine sediment	0.054 mg/kg dry weight (EUSES v2.1)	0.457
Sewage treatment plant	0.997 mg/L (EUSES v2.1)	0.1
Agricultural soil	0.018 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000949 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01



Man via environment - Oral	0.00127 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**24.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

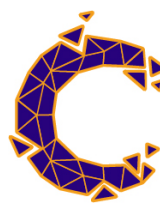
**24.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / Blending and filling processes (closed/dedicated), including both bulk and small quantity additions ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.344
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4) / during charging and sampling ( )**



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Revision Date 06.12.2023

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.6. Worker exposure: Mixing or blending in batch processes (PROC5) / during charging and sampling ()**

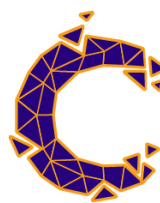
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Sample collection of formulation ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.8. Worker exposure: Mixing or blending in batch processes (PROC5) / Sample collection of formulation ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137



combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Sample collection of incoming raw materials ( )**

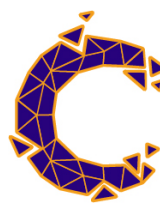
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfer by fixed pipe or flexible hose ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Small pack (drum/bag) transfers at dedicated facility ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



**24.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Small pack (drum/bag) transfers at non-dedicated facility ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance and cleaning ()**

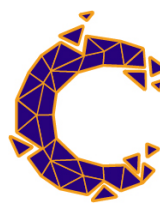
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Top filling of bulk containers (e.g. road cars) ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.15. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Filling of drum and small packages ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046



dermal	systemic	long-term	0.686 mg/kg bw/day	0.069
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.3.16. Worker exposure: Use as laboratory reagent (PROC15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.493
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**24.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

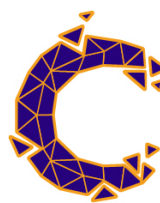
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.





**ES25: Formulation or re-packing, Formulation & (re)packing of substances and mixtures**

**25.1. Title section**

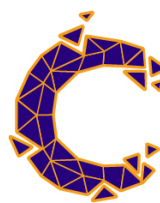
<b>Structured Short Title</b>	: Formulation or re-packing
-------------------------------	-----------------------------

Environment		
CS1	Formulation & (re)packing of substances and mixtures	ERC2, GEST2_I
Worker		
CS2	Use in closed process, no likelihood of exposure	PROC1
CS3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS4	Use in closed batch process (synthesis or formulation)	PROC3
CS5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS6	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS8	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS10	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14
CS11	Use as laboratory reagent	PROC15

**25.2. Conditions of use affecting exposure**

**25.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation & (re)packing of substances and mixtures (GEST2\_I)**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 2 t
Annual amount per site	: <= 20 t
Maximum daily local emission to waste water	: 0.02 kg
Maximum daily local emission to air	: 1 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes



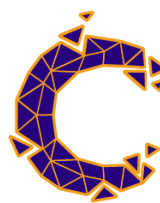
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**25.2.2. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.3. 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
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours



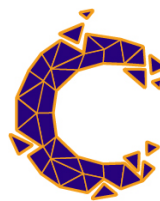
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.4. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

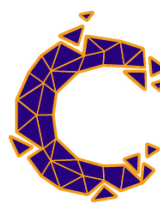
<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 1 %.



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.6. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

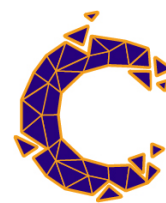


**25.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.8. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	



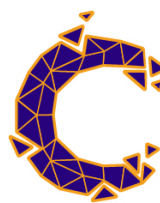
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.9. Control of worker exposure: Transfer of substance or mixture 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, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**25.2.10. 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 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

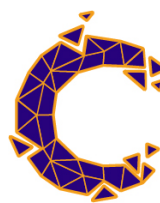
### 25.2.11. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 25.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Formulation & (re)packing of substances and mixtures (GEST2\_I)

Compartment	Exposure level	RCR
Freshwater	0.00251 mg/L (EUSES v2.1)	0.013
Freshwater sediment	0.013 mg/kg dry weight (EUSES v2.1)	0.011
Marine water	0.000178 mg/L (EUSES v2.1)	0.05
Marine sediment	0.00096 mg/kg dry weight (EUSES v2.1)	< 0.01



Sewage treatment plant	0.0097 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00894 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000835 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000845 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**25.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)**

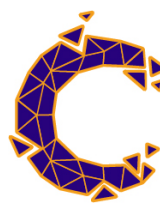
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.0055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**25.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.344
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	





			characterisation.)	
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**25.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

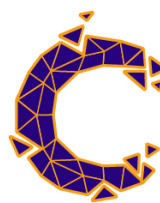
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**25.3.7. 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 level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**25.3.8. 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 level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup>	0.046



			(ECETOC TRA worker v3)	
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**25.3.9. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)**

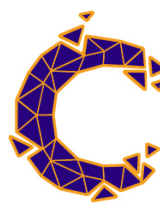
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	3.43 mg/kg bw/day (ECETOC TRA worker v3)	0.343
combined routes	systemic	long-term		0.802
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**25.3.11. Worker exposure: Use as laboratory reagent (PROC15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.493



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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#### 25.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

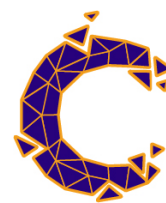
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES26: Use at industrial site, Industrial use of fuel additives and additised fuels**

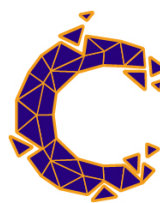
**26.1. Title section**

<b>Structured Short Title</b>	: Use at industrial sites	
<b>Environment</b>		
<b>CS1</b>	<b>Industrial use of fuel additives and additised fuels</b>	ERC7,
<b>Worker</b>		
<b>CS2</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</b>	PROC8b
<b>CS3</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</b>	PROC8a
<b>CS4</b>	<b>Use as fuel for heating or power</b>	PROC16,
<b>CS5</b>	<b>Maintenance activities including draining, refilling and testing</b>	PROC8b,
<b>CS6</b>	<b>Disposal of waste product and used containers</b>	PROC8b,

**26.2. Conditions of use affecting exposure**

**26.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7) / Industrial use of fuel additives and additised fuels ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount per site	: <= 1 t
Annual amount per site	: <= 20 t
Maximum daily local emission to waste water	: 0.01 kg
Maximum daily local emission to air	: 5 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

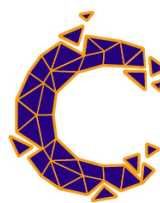


**26.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**26.2.3. 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 concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	



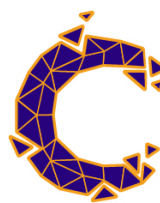
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**26.2.4. Control of worker exposure: Use of fuels (PROC16) / Use as fuel for heating or power ( )**

Product (article) characteristics	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**26.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance activities including draining, refilling and testing ( )**

Product (article) characteristics	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

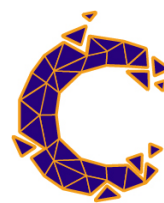
**26.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Disposal of waste product and used containers ()**

Product (article) characteristics	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**26.3. Exposure estimation and reference to its source**

**26.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7) / Industrial use of fuel additives and additised fuels ()**

Compartment	Exposure level	RCR
Freshwater	0.00201 mg/L (EUSES v2.1)	0.01
Freshwater sediment	0.011 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.000129 mg/L (EUSES v2.1)	< 0.01



Marine sediment	0.000691 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0.00499 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00894 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000152 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00101 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

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

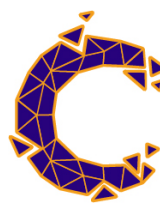
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**26.3.3. 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 level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**26.3.4. Worker exposure: Use of fuels (PROC16) / Use as fuel for heating or power ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.013





dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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**26.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance activities including draining, refilling and testing ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**26.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Disposal of waste product and used containers ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**26.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

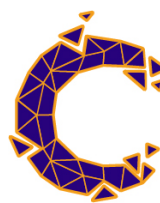
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES27: Use at industrial site, Rubber production and processing**

**27.1. Title section**

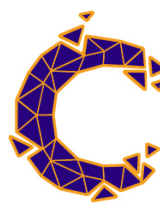
<b>Structured Short Title</b>	: Use at industrial sites
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Environment		
<b>CS1</b>	<b>Rubber production and processing</b>	ERC4, ESVOC SpERC 4.19.v1
Worker		
<b>CS2</b>	<b>Use in closed process, no likelihood of exposure</b>	PROC1
<b>CS3</b>	<b>Use in closed, continuous process with occasional controlled exposure</b>	PROC2
<b>CS4</b>	<b>Use in closed batch process (synthesis or formulation)</b>	PROC3
<b>CS5</b>	<b>Use in batch and other process (synthesis) where opportunity for exposure arises</b>	PROC4
<b>CS6</b>	<b>Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</b>	PROC5
<b>CS7</b>	<b>Calendering operations</b>	PROC6
<b>CS8</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</b>	PROC8a
<b>CS9</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</b>	PROC8b
<b>CS10</b>	<b>Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</b>	PROC9
<b>CS11</b>	<b>Treatment of articles by dipping and pouring</b>	PROC13
<b>CS12</b>	<b>Production of preparations or articles by tableting, compression, extrusion, pelletisation</b>	PROC14
<b>CS13</b>	<b>Use as laboratory reagent</b>	PROC15

**27.2. Conditions of use affecting exposure**

**27.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Rubber production and processing: Industrial (SU10) (ESVOC SpERC 4.19.v1)**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 250 kg
Annual amount per site	: <= 5 t
Maximum daily local emission to waste water	: 2.5 kg
Maximum daily local emission to air	: 2.5 kg
Conditions and measures related to sewage treatment plant	



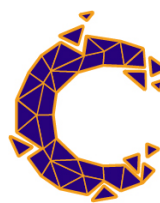
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18,000 m3/d

**27.2.2. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.3. 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

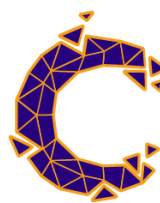


<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.4. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

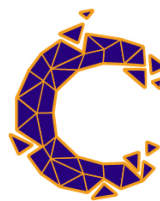
**27.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.6. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



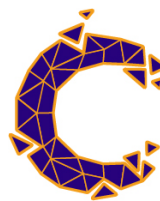
Temperature	: Assumes process temperature up to 40 °C
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**27.2.7. Control of worker exposure: Calendering operations (PROC6)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.8. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	



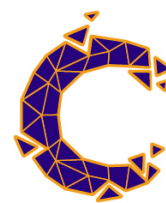
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.10. Control of worker exposure: Transfer of substance or mixture 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, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	



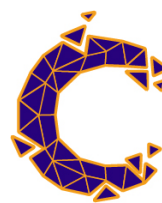
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.11. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**27.2.12. 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, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	





Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use

Temperature : Assumes process temperature up to 40 °C

**27.2.13. 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, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

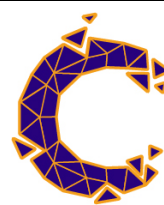
Indoor or outdoor use : Indoor use

Temperature : Assumes process temperature up to 40 °C

**27.3. Exposure estimation and reference to its source**

**27.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Rubber production and processing: Industrial (SU10) (ESVOC SpERC 4.19.v1)**

Compartment	Exposure level	RCR
Freshwater	0.126 mg/L (EUSES v2.1)	0.631
Freshwater sediment	0.679 mg/kg dry weight (EUSES v2.1)	0.574



Marine water	0.013 mg/L (EUSES v2.1)	0.063
Marine sediment	0.067 mg/kg dry weight (EUSES v2.1)	0.57
Sewage treatment plant	1.247 mg/L (EUSES v2.1)	0.125
Agricultural soil	0.02 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000114 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00143 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

**27.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)**

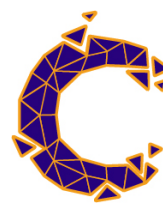
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.023
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.652 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.028
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.034
dermal	local	long-term	(Risk management	



			measures are based on qualitative risk characterisation.)	
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**27.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

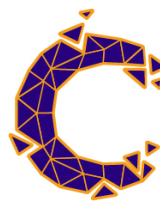
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.7. Worker exposure: Calendaring operations (PROC6)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	2.743 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.32
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.8. 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 level	RCR
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inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

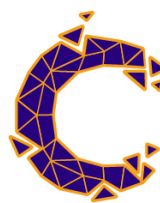
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.10. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.114
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.11. Worker exposure: Treatment of articles by dipping and pouring (PROC13)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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**27.3.12. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.343 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.08
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.3.13. Worker exposure: Use as laboratory reagent (PROC15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.049
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**27.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

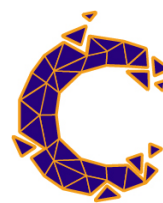
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES28: Use at industrial site, Use in cleaning agents**

**28.1. Title section**

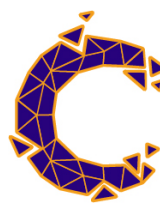
<b>Structured Short Title</b>	: Use at industrial sites
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Environment		
<b>CS1</b>	<b>Use in cleaning agents</b>	ERC4,
Worker		
<b>CS2</b>	<b>Use in closed process, no likelihood of exposure</b>	PROC1
<b>CS3</b>	<b>Use in closed, continuous process with occasional controlled exposure</b>	PROC2
<b>CS4</b>	<b>Use in closed batch process (synthesis or formulation)</b>	PROC3
<b>CS5</b>	<b>Use in batch and other process (synthesis) where opportunity for exposure arises</b>	PROC4
<b>CS6</b>	<b>Industrial spraying</b>	PROC7
<b>CS7</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</b>	PROC8a
<b>CS8</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</b>	PROC8b

**28.2. Conditions of use affecting exposure**

**28.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Cleaning agent ()**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 1 t
Annual amount per site	: <= 20 t
Maximum daily local emission to waste water	: 0.1 kg
Maximum daily local emission to air	: 10 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations



**Other conditions affecting environmental exposure**

Receiving surface water flow : 18,000 m3/d

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

**Product (article) characteristics**

Covers concentrations up to 15 %

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Use in closed process, no likelihood of exposure  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

**General measures (eye irritants)**

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use

Temperature : Assumes process temperature up to 40 °C

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

**Product (article) characteristics**

Covers concentrations up to 15 %

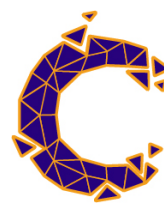
Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Closed continuous process with occasional controlled exposure  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.



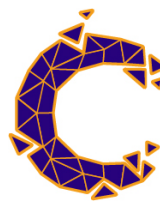
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

Product (article) characteristics	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
<p>Avoid direct eye contact with product, also via contamination on hands.                      Avoid splashing.                      Provide a basic standard of general ventilation (1 to 3 air changes per hour).                      Occupational Health and Safety Management System: Advanced.                      Closed batch process with occasional controlled exposure</p>	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

Product (article) characteristics	
Covers concentrations up to 15 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	





Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Use suitable eye protection.  
For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

**28.2.6. Control of worker exposure: Industrial spraying (PROC7)**

**Product (article) characteristics**

Covers concentrations up to 15 %  
Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.  
Inhalation - minimum efficiency of >= 95 %  
Wear suitable respiratory protection.  
Inhalation - minimum efficiency of >= 90 %  
For further specification, refer to section 8 of the SDS.

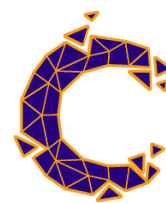
**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

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

**Product (article) characteristics**

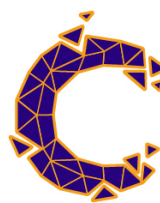
Covers concentrations up to 15 %



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**28.2.8. 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 concentrations up to 15 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C



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

#### 28.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Cleaning agent ()

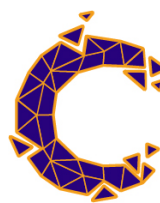
Compartment	Exposure level	RCR
Freshwater	0.0065 mg/L (EUSES v2.1)	0.032
Freshwater sediment	0.035 mg/kg dry weight (EUSES v2.1)	0.03
Marine water	0.000577 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.00311 mg/kg dry weight (EUSES v2.1)	0.026
Sewage treatment plant	0.05 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.0094 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000228 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.0012 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.033 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.02 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	0.822 mg/kg bw/day (ECETOC TRA worker v3)	0.082
combined routes	systemic	long-term		0.137
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



**28.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.912 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.165
dermal	systemic	long-term	0.414 mg/kg bw/day (ECETOC TRA worker v3)	0.041
combined routes	systemic	long-term		0.207
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

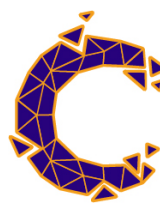
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	4.116 mg/kg bw/day (ECETOC TRA worker v3)	0.412
combined routes	systemic	long-term		0.687
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**28.3.6. Worker exposure: Industrial spraying (PROC7)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	33.03 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.551
dermal	systemic	long-term	1.286 mg/kg bw/day (ECETOC TRA worker v3)	0.129
combined routes	systemic	long-term		0.679
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**28.3.7. 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 level	RCR
inhalative	systemic	long-term	33.03 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.551
dermal	systemic	long-term	1.645 mg/kg bw/day (ECETOC TRA	0.165



			worker v3)	
combined routes	systemic	long-term		0.715
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**28.3.8. 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 level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	1.645 mg/kg bw/day (ECETOC TRA worker v3)	0.165
combined routes	systemic	long-term		0.44
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**28.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

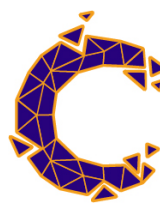
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES29: Widespread use by professional workers, Professional use of fuel additives and additised fuels**

**29.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers	
<b>Environment</b>		
<b>CS1</b>	<b>Professional use of fuel additives and additised fuels</b>	ERC9b, ERC9a,
<b>Worker</b>		
<b>CS2</b>	<b>Transfer of substance or mixture (charging/discharging) at dedicated facilities</b>	PROC8b
<b>CS3</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</b>	PROC8a
<b>CS4</b>	<b>Use as fuel for heating or power</b>	PROC16,
<b>CS5</b>	<b>Maintenance activities including draining, refilling and testing</b>	PROC8b,
<b>CS6</b>	<b>Disposal of waste product and used containers</b>	PROC8b,

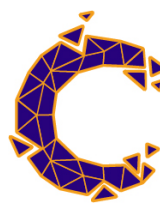
**29.2. Conditions of use affecting exposure**

**29.2.1. Control of environmental exposure: Widespread use of functional fluid (outdoor) (ERC9b) / Widespread use of functional fluid (indoor) (ERC9a) / Professional use of fuel additives and additised fuels ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount for wide dispersive uses	: <= 0.011 kg
Maximum daily local emission to waste water	: 0.55 g
<b>Conditions and measures related to sewage treatment plant</b>	
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: Particular considerations on the waste treatment operations

**29.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	



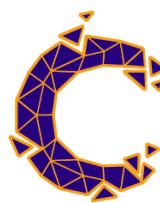
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**29.2.4. Control of worker exposure: Use of fuels (PROC16) / Use as fuel for heating or power ()**

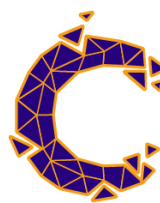
<b>Product (article) characteristics</b>
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Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**29.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance activities including draining, refilling and testing ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C





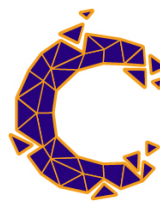
**29.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Disposal of waste product and used containers ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.01 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**29.3. Exposure estimation and reference to its source**

**29.3.1. Environmental release and exposure: Widespread use of functional fluid (outdoor) (ERC9b) / Widespread use of functional fluid (indoor) (ERC9a) / Professional use of fuel additives and additised fuels ()**

Compartment	Exposure level	RCR
Freshwater	0.00154 mg/L (EUSES v2.1)	< 0.01
Freshwater sediment	0.00828 mg/kg dry weight (EUSES v2.1)	< 0.01
Marine water	0.0000814 mg/L (EUSES v2.1)	< 0.01
Marine sediment	0.000438 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0.000274 mg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00885 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0000758 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.000823 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01



**29.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

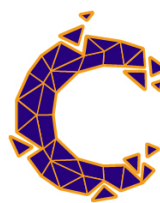
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	13.76 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.229
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0.367
dermal	local	long-term		

**29.3.4. Worker exposure: Use of fuels (PROC16) / Use as fuel for heating or power ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.551 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.013
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**29.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Maintenance activities including draining, refilling and testing ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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**29.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Disposal of waste product and used containers ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**29.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

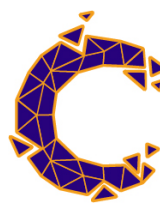
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES30: Widespread use by professional workers, Use in coatings**

**30.1. Title section**

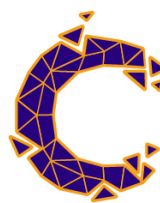
<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
<b>CS1</b>	<b>Use in coatings</b>	ERC8d, ERC8a, GEST3_I, GEST3_P, GEST3_C
Worker		
<b>CS2</b>	<b>Use in closed process, no likelihood of exposure</b>	PROC1
<b>CS3</b>	<b>Use in closed, continuous process with occasional controlled exposure</b>	PROC2
<b>CS4</b>	<b>Use in closed batch process (synthesis or formulation)</b>	PROC3
<b>CS5</b>	<b>Use in batch and other process (synthesis) where opportunity for exposure arises</b>	PROC4
<b>CS6</b>	<b>Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</b>	PROC5
<b>CS7</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</b>	PROC8a
<b>CS8</b>	<b>Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</b>	PROC8b
<b>CS9</b>	<b>Roller application or brushing</b>	PROC10
<b>CS10</b>	<b>Non industrial spraying</b>	PROC11
<b>CS11</b>	<b>Treatment of articles by dipping and pouring</b>	PROC13
<b>CS12</b>	<b>Use as laboratory reagent</b>	PROC15
<b>CS13</b>	<b>Hand-mixing with intimate contact and only PPE available</b>	PROC19

**30.2. Conditions of use affecting exposure**

**30.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Use in coatings (GEST3\_I, GEST3\_P, GEST3\_C)**

Amount used, frequency and duration of use (or from service life)	
Daily amount for wide dispersive uses	: 0.011 kg
Maximum daily local emission to waste water	: 0.011 kg
Conditions and measures related to sewage treatment plant	
STP Water - minimum efficiency of 0.255 %	



**Conditions and measures related to treatment of waste (including article waste)**

Waste treatment : Particular considerations on the waste treatment operations

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

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Use in closed process, no likelihood of exposure  
Occupational Health and Safety Management System: Basic.

**Conditions and measures related to personal protection, hygiene and health evaluation**

**General measures (eye irritants)**

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use

Temperature : Assumes process temperature up to 40 °C

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

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

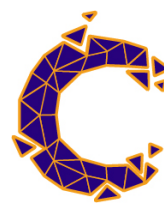
Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Duration : Covers daily exposures up to 8 hours

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Closed continuous process with occasional controlled exposure  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Basic.



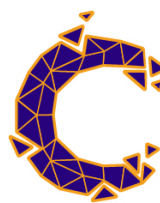
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
<p>Avoid direct eye contact with product, also via contamination on hands.                      Avoid splashing.                      Closed batch process with occasional controlled exposure                      Provide a basic standard of general ventilation (1 to 3 air changes per hour).                      Occupational Health and Safety Management System: Basic.</p>	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	



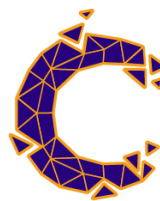
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.6. 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 concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.7. 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 concentrations up to 4 %	
Physical form of product	: Liquid



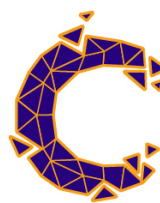
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.8. 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 concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.9. Control of worker exposure: Roller application or brushing (PROC10)**

<b>Product (article) characteristics</b>
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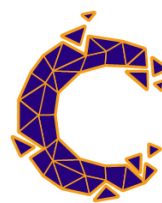




Covers concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.10. Control of worker exposure: Non industrial spraying (PROC11)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
Low application rate (0.03 - 0.3 l/minute)	
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Room size	: Any size workroom
Temperature	: Assumes process temperature up to 25 °C



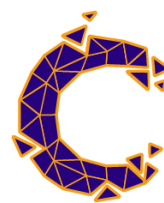
Distance from the worker to the emission source < 1 m

**30.2.11. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)**

<b>Product (article) characteristics</b>	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**30.2.12. 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, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	



Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

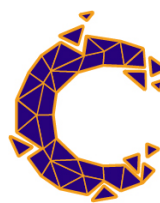
### 30.2.13. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Product (article) characteristics	
Covers concentrations up to 4 %	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 30.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Use in coatings (GEST3\_I, GEST3\_P, GEST3\_C)

Compartment	Exposure level	RCR
Freshwater	0.00206 mg/L	0.01
Freshwater sediment	0.011 mg/kg dry weight	< 0.01
Marine water	0.000134 mg/L	< 0.01
Marine sediment	0.000718 mg/kg dry weight	< 0.01
Sewage treatment plant	0.00549 mg/L	< 0.01
Agricultural soil	0.0089 mg/kg dry weight	< 0.01
Man via environment - Inhalation	0.0000758 mg/m <sup>3</sup>	< 0.01
Man via environment - Oral	0.000826 mg/kg bw/day	< 0.01



Man via environment - combined routes		< 0.01
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**30.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

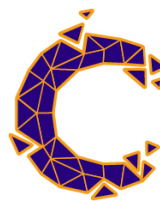
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.596
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	16.52 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.275
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.344
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184



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Revision Date 06.12.2023

dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.321
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

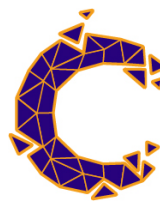
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.458
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.7. 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 level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.733
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.8. 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 level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.458
dermal	local	long-term	(Risk management measures are based	



			on qualitative risk characterisation.)	
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**30.3.9. Worker exposure: Roller application or brushing (PROC10)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	3.84 mg/kg bw/day (ECETOC TRA worker v3)	0.384
combined routes	systemic	long-term		0.843
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.10. Worker exposure: Non industrial spraying (PROC11)**

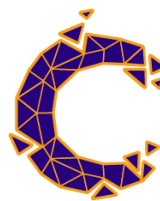
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.2 mg/m <sup>3</sup> (ART v1.5)	0.153
dermal	systemic	long-term	4.76 mg/kg bw/day (ART v1.5)	0.476
combined routes	systemic	long-term		0.629
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.11. Worker exposure: Treatment of articles by dipping and pouring (PROC13)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.458
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.3.12. Worker exposure: Use as laboratory reagent (PROC15)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.034



			worker v3)	
combined routes	systemic	long-term		0.493
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.459
dermal	systemic	long-term	0.84 mg/kg bw/day (ECETOC TRA worker v3)	0.084
combined routes	systemic	long-term		0.542
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**30.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

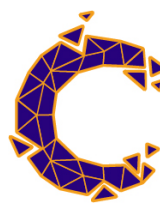
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

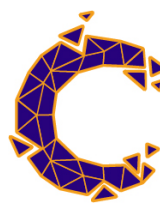


**ES31: Use at industrial site, Use as solvent**

**31.1. Title section**

<b>Structured Short Title</b>	: Use at industrial sites
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Environment		
<b>CS1</b>	<b>Use as solvent</b>	ERC4,
Worker		
<b>CS2</b>	<b>General process exposures, no sampling, Outdoor</b>	PROC1,, CS57, OC9
<b>CS3</b>	<b>General process exposures, Sample collection, Outdoor</b>	PROC2,, OC9
<b>CS4</b>	<b>General process exposures, Indoor</b>	PROC3,, OC8
<b>CS5</b>	<b>General process exposures, Outdoor</b>	PROC3,, OC9
<b>CS6</b>	<b>General exposures (open systems), Indoor</b>	PROC4, CS16, OC8
<b>CS7</b>	<b>General exposures (open systems), Outdoor</b>	PROC4, CS16, OC9
<b>CS8</b>	<b>Sample collection: process sampling indoor</b>	PROC8b,
<b>CS9</b>	<b>Sample collection: process sampling outdoor</b>	PROC8b
<b>CS10</b>	<b>Laboratory activities, Indoor</b>	PROC15, CS36, OC8
<b>CS11</b>	<b>Bulk transfers, without local exhaust ventilation, Indoor</b>	PROC8b, CS14, CS110, OC8
<b>CS12</b>	<b>Bulk transfers, without local exhaust ventilation, Outdoor</b>	PROC8b, CS14, CS110, OC9
<b>CS13</b>	<b>Bulk transfers, with local exhaust ventilation, Indoor</b>	PROC8b, CS14, CS109, OC8
<b>CS14</b>	<b>Bulk transfers, with local exhaust ventilation, Outdoor</b>	PROC8b, CS14, CS109, OC9
<b>CS15</b>	<b>Open, Bulk transfers, Aerosol, Indoor</b>	PROC8b, 48, 106, CS14,, OC8
<b>CS16</b>	<b>Open, Bulk transfers, Outdoor</b>	PROC8b, 48, 106, CS14,, OC9
<b>CS17</b>	<b>Clean down and Maintenance, Equipment cleaning and maintenance, Indoor</b>	PROC8a,, CS39, OC8
<b>CS18</b>	<b>Clean down and Maintenance, Equipment cleaning and maintenance, Outdoor</b>	PROC8a,, CS39, OC9
<b>CS19</b>	<b>Storage, samples collected at dedicated sample point, Indoor</b>	PROC1, CS67,, OC8
<b>CS20</b>	<b>Storage, samples collected at dedicated sample point, Outdoor</b>	PROC1, CS67,, OC9
<b>CS21</b>	<b>Storage, Indoor</b>	PROC2, CS67,, OC8





CS22	Storage, samples collected at dedicated sample point, Outdoor	PROC2, CS67,, OC9
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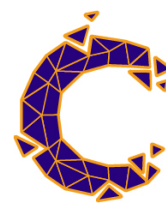
### 31.2. Conditions of use affecting exposure

#### 31.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use as solvent ()

Amount used, frequency and duration of use (or from service life)	
Fraction of EU tonnage used in region:	: 100 %
Daily amount per site	: <= 13.4 t
Annual amount per site	: <= 268 t
Maximum daily local emission to waste water	: 1.34 kg
Maximum daily local emission to air	: 13400 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m3/d

#### 31.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / General process exposures () / no sampling (CS57) / Outdoor (OC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands.	



Avoid splashing.  
Use in closed process, no likelihood of exposure  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Outdoor use

Temperature : Assumes process temperature up to 40 °C

**31.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / Sample collection () / Outdoor (OC9)**

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Use frequency : Duration of the activity 1 h/day

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Closed continuous process with occasional controlled exposure  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)

For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Outdoor use

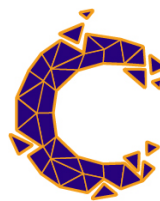
Temperature : Assumes process temperature up to 40 °C

**31.2.4. 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) / General process exposures () / Indoor (OC8)**

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

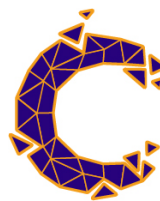


<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.5. 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) / General process exposures () / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced. Closed batch process with occasional controlled exposure	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

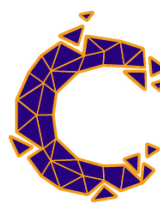
**31.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures (open systems) (CS16) / Indoor (OC8)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures (open systems) (CS16) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection. For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use



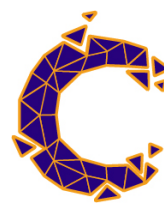
Temperature	: Assumes process temperature up to 40 °C
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**31.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Sample collection: process sampling indoor ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of >= 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	



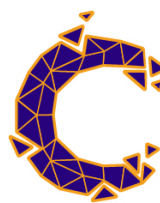
General measures (eye irritants)	
Use suitable eye protection.	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.10. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / without local exhaust ventilation (CS110) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	



Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Provide a basic standard of general ventilation (1 to 3 air changes per hour).  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Use suitable eye protection.  
Wear suitable gloves tested to EN374.  
Dermal - minimum efficiency of  $\geq 80\%$   
For further specification, refer to section 8 of the SDS.

**Other conditions affecting workers exposure**

Indoor or outdoor use : Indoor use  
Temperature : Assumes process temperature up to 40 °C

**31.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / without local exhaust ventilation (CS110) / Outdoor (OC9)**

**Product (article) characteristics**

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

**Amount used, frequency and duration of use (or from service life)**

Use frequency : Duration of the activity 1 h/day

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.  
Avoid splashing.  
Occupational Health and Safety Management System: Advanced.

**Conditions and measures related to personal protection, hygiene and health evaluation**

General measures (eye irritants)  
Use suitable eye protection.  
Wear suitable gloves tested to EN374.  
Dermal - minimum efficiency of  $\geq 80\%$   
For further specification, refer to section 8 of the SDS.

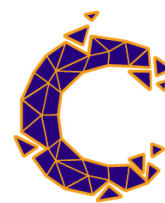
**Other conditions affecting workers exposure**

Indoor or outdoor use : Outdoor use  
Temperature : Assumes process temperature up to 40 °C

**31.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / with local exhaust ventilation (CS109) / Indoor (OC8)**

**Product (article) characteristics**

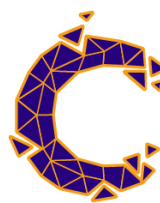
Covers percentage substance in the product up to 100 %.



Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / with local exhaust ventilation (CS109) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C



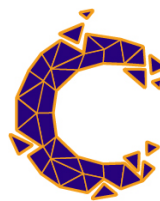


**31.2.15. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Open (48, 106) / Bulk transfers (CS14) / Aerosol () / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Open (48, 106) / Bulk transfers (CS14) / Aerosol () / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	



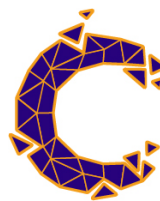
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.17. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance () / Equipment cleaning and maintenance (CS39) / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.18. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance () / Equipment cleaning and maintenance (CS39) / Outdoor (OC9)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day

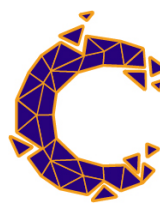


Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of $\geq 80\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.19. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (CS67) / samples collected at dedicated sample point () / Indoor (OC8)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

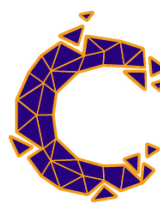
**31.2.20. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (CS67) / samples collected at dedicated sample point () / Outdoor (OC9)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Use in closed process, no likelihood of exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**31.2.21. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage (CS67) / samples collected at dedicated sample point () / Indoor (OC8)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Closed continuous process with occasional controlled exposure Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use



Temperature : Assumes process temperature up to 40 °C

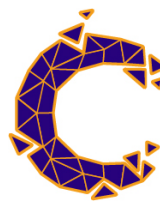
**31.2.22. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage (CS67) / samples collected at dedicated sample point () / Outdoor (OC9)**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Closed continuous process with occasional controlled exposure Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

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

**31.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use as solvent ()**

Compartment	Exposure level	RCR
Freshwater	0.068 mg/L (EUSES v2.1)	0.342
Freshwater sediment	0.368 mg/kg dry weight (EUSES v2.1)	0.311
Marine water	0.00676 mg/L (EUSES v2.1)	0.034
Marine sediment	0.036 mg/kg dry weight (EUSES v2.1)	0.307
Sewage treatment plant	0.668 mg/L (EUSES v2.1)	0.067
Agricultural soil	0.145 mg/kg dry weight (EUSES v2.1)	0.058
Man via environment - Inhalation	0.204 mg/m <sup>3</sup> (EUSES v2.1)	0.014
Man via environment - Oral	0.484 mg/kg bw/day (EUSES v2.1)	0.097
Man via environment - combined		< 0.111



routes		
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**31.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / General process exposures () / no sampling (CS57) / Outdoor (OC9)**

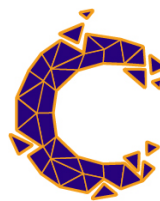
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.00771 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / General process exposures () / Sample collection () / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.771 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.013
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.15
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / General process exposures () / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.304 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.055
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.124
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	



**31.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) / General process exposures () / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.313 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.039
dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.108
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures (open systems) (CS16) / Indoor (OC8)**

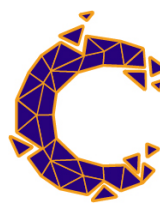
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA worker v3)	0.686
combined routes	systemic	long-term		0.778
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / General exposures (open systems) (CS16) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA worker v3)	0.686
combined routes	systemic	long-term		0.75
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Sample collection: process sampling indoor ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA)	0.046



			worker v3)	
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.32
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

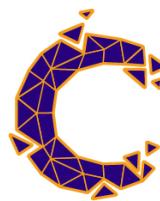
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.306
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.10. Worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA worker v3)	0.034
combined routes	systemic	long-term		0.126
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / without local exhaust ventilation (CS110) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366
dermal	local	long-term	(Risk management measures are based	





			on qualitative risk characterisation.)	
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**31.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / without local exhaust ventilation (CS110) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.338
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

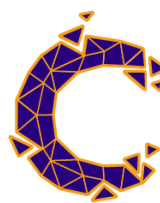
**31.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / with local exhaust ventilation (CS109) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / with local exhaust ventilation (CS109) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.338
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.15. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Open (48, 106) / Bulk transfers (CS14) / Aerosol () / Indoor (OC8)**



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Revision Date 06.12.2023

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.366
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Open (48, 106) / Bulk transfers (CS14) / Aerosol () / Outdoor (OC9)**

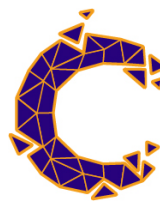
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.338
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.17. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance () / Equipment cleaning and maintenance (CS39) / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.01 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.184
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA worker v3)	0.274
combined routes	systemic	long-term		0.458
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.18. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Clean down and Maintenance () / Equipment cleaning and maintenance (CS39) / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	7.709 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.128
dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA)	0.274



			worker v3)	
combined routes	systemic	long-term		0.403
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.19. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (CS67) / samples collected at dedicated sample point () / Indoor (OC8)**

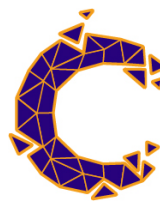
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.20. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) / Storage (CS67) / samples collected at dedicated sample point () / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.039 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		< 0.01
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.3.21. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage (CS67) / samples collected at dedicated sample point () / Indoor (OC8)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	5.507 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.092
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.229
dermal	local	long-term	(Risk management	



			measures are based on qualitative risk characterisation.)	
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**31.3.22. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) / Storage (CS67) / samples collected at dedicated sample point () / Outdoor (OC9)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.201
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**31.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

**Environment**

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

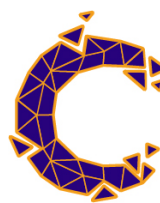
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Human Health**

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES32: Formulation or re-packing, Industrial formulation: Blending with solid fertilizer**

**32.1. Title section**

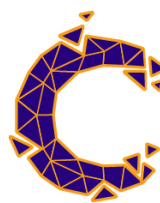
<b>Structured Short Title</b>	: Formulation or re-packing
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Environment		
<b>CS1</b>	<b>Industrial formulation: Blending with solid fertilizer</b>	ERC2,
Worker		
<b>CS2</b>	<b>Coupling/uncoupling IBC containing formulated product</b>	PROC8b,
<b>CS3</b>	<b>Manual dosing/pour of liquid formulated product</b>	PROC8b,
<b>CS4</b>	<b>Blending of formulated product with granular urea</b>	PROC4,
<b>CS5</b>	<b>Packing off and tying off fertilizer bags</b>	PROC8b,

**32.2. Conditions of use affecting exposure**

**32.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid fertilizer ( )**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 1.51 t
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 100 %
Annual amount per site	: <= 452 t
Maximum daily local emission to waste water	: 3.02 kg
Maximum daily local emission to air	: 7.55 kg
Technical and organisational conditions and measures	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): Water - minimum efficiency of 60 %	
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations



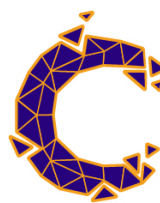
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Indoor use
Water contact during use	

**32.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ( )**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 1 h/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**32.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ( )**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing.	



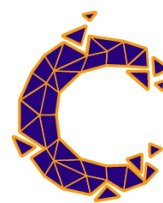
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**32.2.4. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**32.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Packing off and tying off fertilizer bags ()**

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



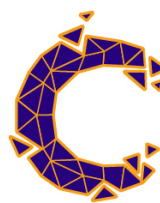
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of >= 90 %	
Wear suitable respiratory protection. Dermal - minimum efficiency of >= 90 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 32.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid fertilizer ( )

Release route	Release rate	Release estimation method
Water	99.74 %	
Air	0.033 %	
Waste	0.222 %	

Compartment	Exposure level	RCR
Freshwater	0.152 mg/L (EUSES v2.1)	0.761
Freshwater sediment	0.818 mg/kg dry weight (EUSES v2.1)	0.691
Marine water	0.015 mg/L (EUSES v2.1)	0.076
Marine sediment	0.081 mg/kg dry weight (EUSES v2.1)	0.688
Sewage treatment plant	1.506 mg/L (EUSES v2.1)	0.151
Agricultural soil	0.00995 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.0018 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00818 mg/kg bw/day (EUSES v2.1)	< 0.01





Man via environment - combined routes		< 0.01
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**32.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.201
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

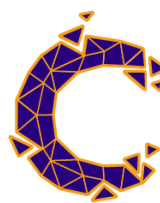
**32.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**32.3.4. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.039
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**32.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Packing off and tying off fertilizer bags ( )**



Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.165 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.016
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

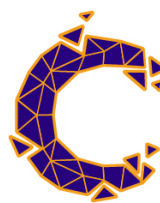
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES33: Formulation or re-packing, Industrial formulation: Blending with liquid fertilizer**

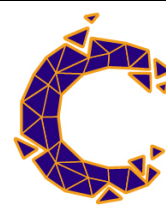
**33.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing	
<b>Environment</b>		
<b>CS1</b>	<b>Industrial formulation: Blending with liquid fertilizer</b>	ERC2,
<b>Worker</b>		
<b>CS2</b>	<b>Coupling/uncoupling IBC containing formulated product</b>	PROC8b,
<b>CS3</b>	<b>Manual dosing/pour of liquid formulated product</b>	PROC8b,
<b>CS4</b>	<b>Blending of formulated product with liquid UAN (Urea ammonium nitrate)</b>	PROC4,
<b>CS5</b>	<b>Loading (coupling and uncoupling) road tanker</b>	PROC8a,

**33.2. Conditions of use affecting exposure**

**33.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid fertilizer ( )**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount per site	: <= 1.51 t
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 100 %
Annual amount per site	: <= 151 t
Maximum daily local emission to waste water	: 3.02 kg
Maximum daily local emission to air	: 7.55 kg
<b>Technical and organisational conditions and measures</b>	
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of <sup>3</sup> (%): Water - minimum efficiency of 60 %	
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.



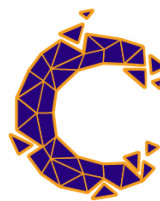
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Indoor use
Water contact during use	

**33.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ( )**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**33.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ( )**

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Use frequency	: Duration of the activity 15 min/day
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing.	



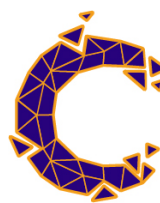
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**33.2.4. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**33.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading (coupling and uncoupling) road tanker ()**

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



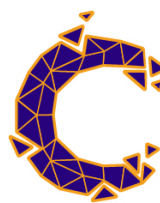
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
Wear suitable respiratory protection. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

#### 33.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid fertilizer ( )

Release route	Release rate	Release estimation method
Water	99.74 %	
Air	0.033 %	
Waste	0.222 %	

Compartment	Exposure level	RCR
Freshwater	0.152 mg/L (EUSES v2.1)	0.761
Freshwater sediment	0.818 mg/kg dry weight (EUSES v2.1)	0.691
Marine water	0.015 mg/L (EUSES v2.1)	0.076
Marine sediment	0.081 mg/kg dry weight (EUSES v2.1)	0.688
Sewage treatment plant	1.506 mg/L (EUSES v2.1)	0.151
Agricultural soil	0.00922 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000651 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00296 mg/kg bw/day (EUSES v2.1)	< 0.01



Man via environment - combined routes		< 0.01
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**33.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.169
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

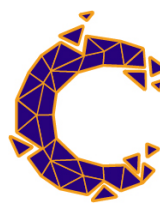
**33.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.169
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**33.3.4. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	0.069 mg/kg bw/day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	long-term		0.039
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**33.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading (coupling and uncoupling) road tanker ()**



Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.055 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.015
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

#### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

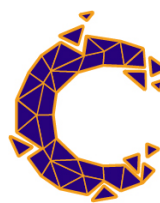
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

#### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.





**ES34: Formulation or re-packing, Industrial formulation: Blending with solid herbicide**

**34.1. Title section**

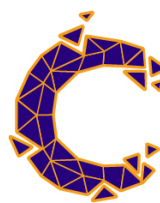
<b>Structured Short Title</b>	: Formulation or re-packing
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Environment		
<b>CS1</b>	<b>Industrial formulation: Blending with solid herbicide</b>	ERC2,
Worker		
<b>CS2</b>	<b>Coupling/uncoupling IBC containing formulated product</b>	PROC8b,
<b>CS3</b>	<b>Manual dosing/pour of liquid formulated product</b>	PROC8b,
<b>CS4</b>	<b>Blending of formulated product</b>	PROC4,
<b>CS5</b>	<b>Packing off and tying off herbicide bags</b>	PROC8b,

**34.2. Conditions of use affecting exposure**

**34.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid herbicide ()**

Amount used, frequency and duration of use (or from service life)	
Daily amount per site	: <= 220 kg
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 100 %
Annual amount per site	: <= 67 t
Maximum daily local emission to waste water	: 1.1 kg
Maximum daily local emission to air	: 1.1 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Indoor use
Water contact during use	

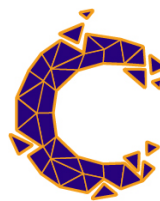


**34.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**34.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ( )**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants)	



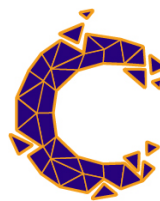
Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**34.2.4. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 20 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

**34.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Packing off and tying off herbicide bags ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 20 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 4 h/day



Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a basic standard of general ventilation (1 to 3 air changes per hour). Occupational Health and Safety Management System: Advanced.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
Wear suitable respiratory protection. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

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

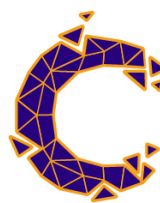
#### 34.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Industrial formulation: Blending with solid herbicide ()

Release route	Release rate	Release estimation method
Water	99.74 %	
Air	0.033 %	
Waste	0.222 %	

Compartment	Exposure level	RCR
Freshwater	0.056 mg/L (EUSES v2.1)	0.282
Freshwater sediment	0.303 mg/kg dry weight (EUSES v2.1)	0.256
Marine water	0.00556 mg/L (EUSES v2.1)	0.028
Marine sediment	0.03 mg/kg dry weight (EUSES v2.1)	0.253
Sewage treatment plant	0.549 mg/L (EUSES v2.1)	0.055
Agricultural soil	0.00901 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.000331 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00236 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 34.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Coupling/uncoupling IBC containing formulated product ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR



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Revision Date 06.12.2023

inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.201
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**34.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Manual dosing/pour of liquid formulated product ()**

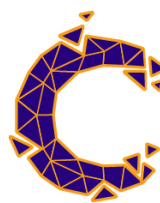
Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.753 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.046
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.183
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**34.3.4. Worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Blending of formulated product ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	11.56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.193
dermal	systemic	long-term	0.412 mg/kg bw/day (ECETOC TRA worker v3)	0.041
combined routes	systemic	long-term		0.234
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**34.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Packing off and tying off herbicide bags ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.991 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.017
dermal	systemic	long-term	0.823 mg/kg bw/day (ECETOC TRA worker v3)	0.082



combined routes	systemic	long-term		0.099
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

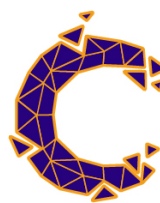
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES35: Formulation or re-packing, Industrial formulation: Repacker of formulated product to small pack sizes**

**35.1. Title section**

<b>Structured Short Title</b>	: Formulation or re-packing	
<b>Environment</b>		
<b>CS1</b>	<b>Industrial formulation: Repacker of formulated product to small pack sizes</b>	ERC2
<b>Worker</b>		
<b>CS2</b>	<b>Repacking of the formulated product into small packs</b>	PROC9,

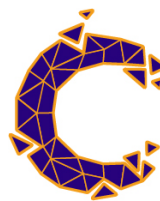
**35.2. Conditions of use affecting exposure**

**35.2.1. Control of environmental exposure: Formulation into mixture (ERC2)**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Fraction of EU tonnage used in region:	: 100 %
Daily amount for wide dispersive uses	: <= 1 t
Annual amount per site	: <= 100 t
Maximum daily local emission to waste water	: 1 kg
Maximum daily local emission to air	: 25 kg
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Sewage sludge may be recovered for agricultural or horticultural purposes
STP effluent	: 2,000 m3/d
STP Water - minimum efficiency of 0.255 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.

**35.2.2. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Repacking of the formulated product into small packs ()**

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



<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Occupational Health and Safety Management System: Advanced.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use
Temperature	: Assumes process temperature up to 40 °C

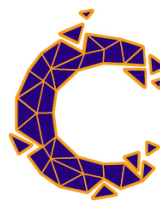
### 35.3. Exposure estimation and reference to its source

#### 35.3.1. Environmental release and exposure: Formulation into mixture (ERC2)

Compartment	Exposure level	RCR
All routes		
Freshwater	0.051 mg/L (EUSES v2.1)	0.257
Freshwater sediment	0.276 mg/kg dry weight (EUSES v2.1)	0.234
Marine water	0.00507 mg/L (EUSES v2.1)	0.025
Marine sediment	0.027 mg/kg dry weight (EUSES v2.1)	0.23
Sewage treatment plant	0.499 mg/L (EUSES v2.1)	0.05
Agricultural soil	0.015 mg/kg dry weight (EUSES v2.1)	< 0.01
Man via environment - Inhalation	0.00198 mg/m <sup>3</sup> (EUSES v2.1)	< 0.01
Man via environment - Oral	0.00556 mg/kg bw/day (EUSES v2.1)	< 0.01
Man via environment - combined routes		< 0.01

#### 35.3.2. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Repacking of the formulated product into small packs ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	19.27 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.321





dermal	systemic	long-term	0.686 mg/kg bw/day (ECETOC TRA worker v3)	0.069
combined routes	systemic	long-term		0.39

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

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

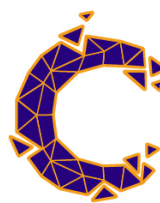
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES36: Widespread use by professional workers, Professional uses, Application of urea coated fertilizer.**

**36.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers	
<b>Environment</b>		
<b>CS1</b>	<b>Professional use: Application of urea coated fertilizer</b>	ERC8d, ERC8a,,
<b>Worker</b>		
<b>CS2</b>	<b>Loading of treated solid urea to broadcaster</b>	PROC8a,
<b>CS3</b>	<b>Application (broadcasting of treated solid urea onto fields)</b>	PROC8a,

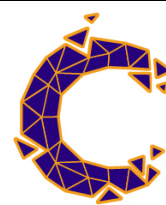
**36.2. Conditions of use affecting exposure**

**36.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Professional use: Application of urea coated fertilizer () / CLE SpERC 8d.1.v4 ()**

<b>Amount used, frequency and duration of use (or from service life)</b>	
Annual application rate	: <= 1064 kg/ha
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide dispersive uses	: <= 0 t
<b>Conditions and measures related to sewage treatment plant</b>	
STP Water - minimum efficiency of 0 %	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: No specific measures identified.
<b>Other conditions affecting environmental exposure</b>	
Indoor or outdoor use	: Covers indoor and outdoor use.
No water contact during use.	

**36.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated solid urea to broadcaster ()**

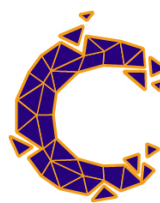
<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 1 h/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**36.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application (broadcasting of treated solid urea onto fields) ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C



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

**36.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Professional use: Application of urea coated fertilizer ( ) / CLE SpERC 8d.1.v4 ( )**

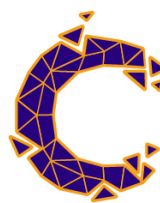
Compartment	Exposure level	RCR
Freshwater	0.173 mg/L (ECPA LET v4.0)	0.873
Freshwater sediment	0.031 mg/kg dry weight (ECPA LET v4.0)	0.032
Marine water	0.017 mg/L (ECPA LET v4.0)	0.085
Marine sediment	0.00307 mg/kg dry weight (ECPA LET v4.0)	0.029
Sewage treatment plant	0 mg/L (measured data)	< 0.01
Agricultural soil	1.05 mg/kg dry weight (ECPA LET v4.0)	0.424
Man via environment - Inhalation	0 mg/m <sup>3</sup> (ECPA LET v4.0)	< 0.01
Man via environment - Oral	0.304 mg/kg bw/day (ECPA LET v4.0)	0.061
Man via environment - combined routes		0.061

**36.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated solid urea to broadcaster ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	1.927 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.032
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.046
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**36.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Application (broadcasting of treated solid urea onto fields) ( )**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	9.636 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.161
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.174
dermal	local	long-term	(Risk management measures are based	



			on qualitative risk characterisation.)	
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#### 36.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

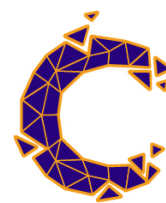
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES37: Widespread use by professional workers, Professional uses, Application of liquid fertilizers.**

**37.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
<b>CS1</b>	<b>Professional use: Application of liquid fertilizer</b>	ERC8d, ERC8a,,
Worker		
<b>CS2</b>	<b>Loading of treated liquid UAN into farm store tank</b>	PROC8a,
<b>CS3</b>	<b>Loading of treated liquid UAN into tractor mounted tank</b>	PROC8a,
<b>CS4</b>	<b>Application (spraying) of treated liquid UAN onto field</b>	PROC11,

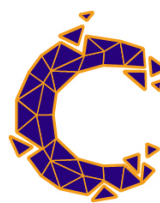
**37.2. Conditions of use affecting exposure**

**37.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / CLE SpERC 8d.2.v4 () / Professional use: Application of liquid fertilizer ()**

Amount used, frequency and duration of use (or from service life)	
Annual application rate	: <= 1064 kg/ha
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide dispersive uses	: <= 0 t
Conditions and measures related to sewage treatment plant	
STP	Water - minimum efficiency of 0 %
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Covers indoor and outdoor use.
No water contact during use.	

**37.2.2. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated liquid UAN into farm store tank ()**

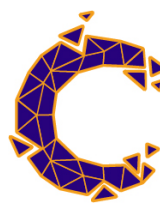
Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**37.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated liquid UAN into tractor mounted tank ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C



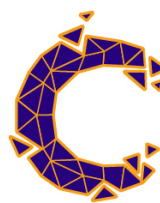
**37.2.4. Control of worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of treated liquid UAN onto field ()**

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
Conditions and measures related to personal protection, hygiene and health evaluation	
General measures (eye irritants)	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90$ %	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**37.3. Exposure estimation and reference to its source**

**37.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / CLE SpERC 8d.2.v4 () / Professional use: Application of liquid fertilizer ()**

Compartment	Exposure level	RCR
Freshwater	0.173 mg/L (ECPA LET v4.0)	0.873
Freshwater sediment	0.031 mg/kg dry weight (ECPA LET v4.0)	0.032
Marine water	0.017 mg/L (ECPA LET v4.0)	0.085
Marine sediment	0.00307 mg/kg dry weight (ECPA LET v4.0)	0.029
Sewage treatment plant	0 mg/L (measured data)	< 0.01
Agricultural soil	1.05 mg/kg dry weight (ECPA LET v4.0)	0.424
Man via environment - Inhalation	0 mg/m <sup>3</sup> (ECPA LET v4.0)	< 0.01
Man via environment - Oral	0.304 mg/kg bw/day (ECPA LET v4.0)	0.061
Man via environment - combined routes		0.061





**37.3.2. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated liquid UAN into farm store tank ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.964 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.016
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.03
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**37.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Loading of treated liquid UAN into tractor mounted tank ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.964 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.016
dermal	systemic	long-term	0.137 mg/kg bw/day (ECETOC TRA worker v3)	0.014
combined routes	systemic	long-term		0.03
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**37.3.4. Worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of treated liquid UAN onto field ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.642
dermal	systemic	long-term	1.071 mg/kg bw/day (ECETOC TRA worker v3)	0.107
combined routes	systemic	long-term		0.75
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**37.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Environment

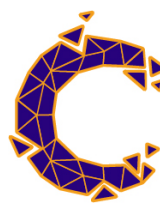
If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

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- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

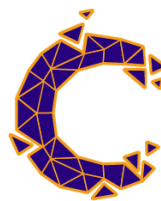
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

#### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES38: Widespread use by professional workers, Professional uses, Application of the liquid formulated product to liquid fertilizer (small packs)**

**38.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
<b>CS1</b>	<b>Application of the liquid formulated product to liquid fertilizer (small packs)</b>	ERC8d,,
Worker		
<b>CS2</b>	<b>Mixing and loading of formulated product into tractor mounted tank.</b>	PROC5,
<b>CS3</b>	<b>Application (spraying) of treated liquid UAN onto field</b>	PROC11,

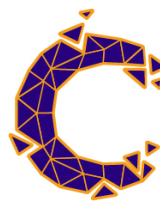
**38.2. Conditions of use affecting exposure**

**38.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / CLE SpERC 8d.2.v4 () / Application of the liquid formulated product to liquid fertilizer (small packs) ()**

Amount used, frequency and duration of use (or from service life)	
Annual application rate	: <= 1064 kg/ha
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide dispersive uses	: <= 0 t
Conditions and measures related to sewage treatment plant	
STP Water - minimum efficiency of 0 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Covers indoor and outdoor use.
No water contact during use.	

**38.2.2. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Mixing and loading of formulated product into tractor mounted tank. ()**

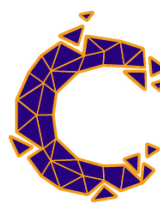
Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**38.2.3. Control of worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of treated liquid UAN onto field ()**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C



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

**38.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / CLE SpERC 8d.2.v4 () / Application of the liquid formulated product to liquid fertilizer (small packs) ()**

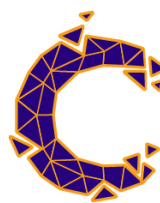
Compartment	Exposure level	RCR
Freshwater	0.173 mg/L (ECPA LET v4.0)	0.873
Freshwater sediment	0.031 mg/kg dry weight (ECPA LET v4.0)	0.032
Marine water	0.017 mg/L (ECPA LET v4.0)	0.085
Marine sediment	0.00307 mg/kg dry weight (ECPA LET v4.0)	0.029
Sewage treatment plant	0 mg/L (measured data)	< 0.01
Agricultural soil	1.05 mg/kg dry weight (ECPA LET v4.0)	0.424
Man via environment - Inhalation	0 mg/m <sup>3</sup> (ECPA LET v4.0)	< 0.01
Man via environment - Oral	0.304 mg/kg bw/day (ECPA LET v4.0)	0.061
Man via environment - combined routes		0.061

**38.3.2. Worker exposure: Mixing or blending in batch processes (PROC5) / Mixing and loading of formulated product into tractor mounted tank. ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	3.855 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.064
dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA worker v3)	0.137
combined routes	systemic	long-term		0.201
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

**38.3.3. Worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of treated liquid UAN onto field ()**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.642
dermal	systemic	long-term	1.071 mg/kg bw/day (ECETOC TRA worker v3)	0.107
combined routes	systemic	long-term		0.75
dermal	local	long-term	(Risk management measures are based on qualitative risk	



			characterisation.)	
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#### 38.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

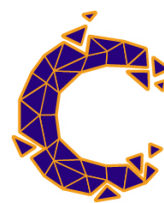
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



**ES39: Widespread use by professional workers, Professional uses, Application of the liquid formulated product to liquid herbicide (small packs)**

**39.1. Title section**

<b>Structured Short Title</b>	: Widespread use by professional workers
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Environment		
<b>CS1</b>	<b>Application of the liquid formulated product to liquid herbicide (small packs)</b>	ERC8d,,
Worker		
<b>CS2</b>	<b>Mixing and loading of formulated product into tractor mounted tank.</b>	PROC5,
<b>CS3</b>	<b>Application (spraying) of herbicide onto fields by tractor-mounted equipment.</b>	PROC11,

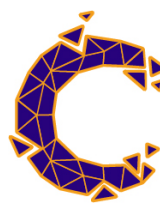
**39.2. Conditions of use affecting exposure**

**39.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / CLE SpERC 8d.2.v4 () / Application of the liquid formulated product to liquid herbicide (small packs) ()**

Amount used, frequency and duration of use (or from service life)	
Annual application rate	: <= 1064 kg/ha
Fraction of EU tonnage used in region:	: 10 %
Daily amount for wide dispersive uses	: <= 0 t
Conditions and measures related to sewage treatment plant	
STP Water - minimum efficiency of 0 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: No specific measures identified.
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Covers indoor and outdoor use.
No water contact during use.	

**39.2.2. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Mixing and loading of formulated product into tractor mounted tank. ()**

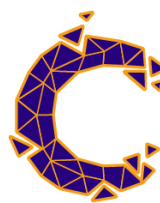
Product (article) characteristics	
Covers concentrations up to 20 %	
Physical form of product	: Liquid



<b>Amount used, frequency and duration of use (or from service life)</b>	
Use frequency	: Duration of the activity 15 min/day
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use
Temperature	: Assumes process temperature up to 40 °C

**39.2.3. Control of worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of herbicide onto fields by tractor-mounted equipment. ()**

<b>Product (article) characteristics</b>	
Covers concentrations up to 0.2 %	
Physical form of product	: Liquid
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Covers daily exposures up to 8 hours
High application rate ( $> 3$ l/minute)	
<b>Technical and organisational conditions and measures</b>	
Avoid direct eye contact with product, also via contamination on hands. Avoid splashing. Occupational Health and Safety Management System: Basic. Personal enclosure: Partially open control room without specific ventilation system Segregation of the source: No segregation	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
General measures (eye irritants) Use suitable eye protection.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of $\geq 90\%$	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use





Temperature : Assumes process temperature up to 40 °C

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

#### 39.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / CLE SpERC 8d.2.v4 () / Application of the liquid formulated product to liquid herbicide (small packs) ()

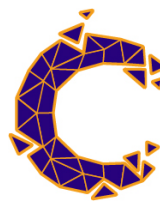
Compartment	Exposure level	RCR
Freshwater	0.173 mg/L (ECPA LET v4.0)	0.873
Freshwater sediment	0.031 mg/kg dry weight (ECPA LET v4.0)	0.032
Marine water	0.017 mg/L (ECPA LET v4.0)	0.085
Marine sediment	0.00307 mg/kg dry weight (ECPA LET v4.0)	0.029
Sewage treatment plant	0 mg/L (measured data)	< 0.01
Agricultural soil	1.05 mg/kg dry weight (ECPA LET v4.0)	0.424
Man via environment - Inhalation	0 mg/m <sup>3</sup> (ECPA LET v4.0)	< 0.01
Man via environment - Oral	0.304 mg/kg bw/day (ECPA LET v4.0)	0.061
Man via environment - combined routes		0.061

#### 39.3.2. Worker exposure: Mixing or blending in batch processes (PROC5) / Mixing and loading of formulated product into tractor mounted tank. ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	2.313 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.039
dermal	systemic	long-term	0.823 mg/kg bw/day (ECETOC TRA worker v3)	0.082
combined routes	systemic	long-term		0.121
dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	

#### 39.3.3. Worker exposure: Non-industrial spraying (PROC11) / Application (spraying) of herbicide onto fields by tractor-mounted equipment. ()

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	long-term	0.0039 mg/m <sup>3</sup> (ART v1.5)	< 0.01
dermal	systemic	long-term	1.071 mg/kg bw/day (ECETOC TRA worker v3)	0.107
combined routes	systemic	long-term		0.107



dermal	local	long-term	(Risk management measures are based on qualitative risk characterisation.)	
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#### 39.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

##### Environment

If a DU has OC/RMMs outside specifications in the ES, then the DU can evaluate whether he works inside the boundaries set by the ES through scaling in EUSES.

The main driving parameters are :

- local amount used (tonnage)
- release factor prior to on-site treatment
- on-site wastewater treatment presence and efficiency
- dilution factor

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

##### Human Health

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

