

**AUGEO® CLEAN MULTI**

Revision Date 26.06.2023

*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® CLEAN MULTI                                               |
| - 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**

Solvay Solutions UK Limited  
P.O.Box 80 Trinity Street  
Oldbury West Midlands B69 4LN  
England  
Telephone: +44 (0)121 552 3333  
Fax: +44 (0)121 541 3235

**E-mail address**

manager.sds@solvay.com

**1.4 Emergency telephone number**

+44(0)1235 239 670 [CareChem 24]

**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.           |
| Reproductive toxicity, Category 2 | H361d: Suspected of damaging the unborn child. |

**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.
- H361d Suspected of damaging the unborn child.

**Precautionary statements**

Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

Response

- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P337 + P313 If eye irritation persists: Get medical advice/ attention.

Disposal

- P501 Dispose of contents/ container to an approved waste disposal plant.

**2.3 Other hazards which do not result in classification**

None known.

**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<br>Regulation (EC) No 1272/2008                                 | Concentration [%] |
|----------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|-------------------|
| 2,2-dimethyl-1,3-dioxolan-4-ylmethanol | CAS-No. :<br>100-79-8<br>EINECS-No. :<br>202-888-7 | Eye irritation, Category 2 ; H319<br>Reproductive toxicity, Category 2 ; H361d | >= 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.

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- When symptoms persist or in all cases of doubt seek medical advice.

**In case of inhalation**

- Move to fresh air.
- Keep at rest.
- Consult a physician if necessary.

**In case of skin contact**

- Take off contaminated clothing and shoes immediately.
- Wash off immediately with soap and plenty of water.
- Use a mild soap if available.
- If skin irritation occurs, seek medical advice/attention.

**In case of eye contact**

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Immediate medical attention is required.

**In case of ingestion**

- Do not induce vomiting without medical advice.
- Rinse mouth with water.
- Do not give anything to drink.
- Keep at rest.
- Consult a physician if necessary.

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

- no data available

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

- no data available

**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)

**Unsuitable extinguishing media**

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

**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.

**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

**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.

|                                               |
|-----------------------------------------------|
| <b>SECTION 6: Accidental release measures</b> |
|-----------------------------------------------|

**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**

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- 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.

**Additional advice**

- Material can create slippery conditions.

**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**

- Pregnant workers should not be exposed to this product.
- 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.

**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
- Keep away from: Hazardous reactions may occur on contact with certain chemicals. (Refer to the list of incompatible materials section 10: Stability-Reactivity).

**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.

**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**

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- 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.

**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**

- Pregnant workers should not be exposed to this product.
- 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**

- Dam up.
- Prevent product from entering sewage system.
- Try to prevent the material from entering drains or water courses.
- Local authorities should be advised if significant spillages cannot be contained.
- 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.

**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>            | Freezing point: -99 °C                                    |
| <b><u>Initial boiling point and boiling range</u></b> | Boiling point/boiling range: 183 - 191 °C ( 1,013.25 hPa) |

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|                                                      |                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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<br>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> :<br>( 20 °C)completely soluble<br><br><u>Solubility in other solvents</u> :<br>Alcohol: miscible<br><br>Esters: miscible<br><br>Ether: miscible<br><br>Aromatic hydrocarbons: miscible<br><br>petroleum ether.: miscible<br><br>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>                                | 1.069 g/cm3 ( 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                                                                                                                                                                                                                                                                     |

**9.2 Other information**

|                                |                                                      |
|--------------------------------|------------------------------------------------------|
| <b><u>Self-ignition</u></b>    | 390 °C ( 1,013 hPa)<br>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**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol LD50 : 7,000 mg/kg - Rat  
Not classified as hazardous for acute oral toxicity according to GHS.  
Published data

##### **Acute inhalation toxicity**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol LC50 - 4 h ( aerosol ) : > 5.11 mg/l - Rat , male and female  
Method: OECD Test Guideline 403  
Not classified as hazardous for acute inhalation toxicity according to GHS.  
No mortality observed at this concentration.  
Unpublished reports

##### **Acute dermal toxicity**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol LD50 : 2,000 mg/kg - Rat , male and female  
Method: OECD Test Guideline 402  
Not classified as hazardous for acute dermal toxicity according to GHS.  
Semiocclusive  
No mortality observed at this dose.  
Unpublished reports

##### **Acute toxicity (other routes of administration)**

No data available

##### Skin corrosion/irritation

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Rabbit  
No skin irritation  
Method: OECD Test Guideline 404  
Semiocclusive  
Unpublished reports

**Serious eye damage/eye irritation**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Rabbit  
Causes serious eye irritation.  
Method: OECD Test Guideline 405  
Unpublished reports

**Respiratory or skin sensitisation**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Maximisation Test - Guinea pig  
Responding animals in GPMT < 30%  
Method: OECD Test Guideline 406  
Unpublished reports

**Mutagenicity**

**Genotoxicity in vitro**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Ames test  
with and without metabolic activation  
  
negative  
Method: OECD Test Guideline 471  
Unpublished reports  
  
Gene mutation assays in mammalian cells.  
Strain: mouse lymphoma cells  
with and without metabolic activation  
  
negative  
Method: OECD Test Guideline 490  
Unpublished reports

**Genotoxicity in vivo**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol In vivo micronucleus test - Mouse  
male  
Intraperitoneal route  
Method: OECD Test Guideline 474  
  
negative  
Unpublished reports

**Carcinogenicity**

No data available

**Toxicity for reproduction and development**

**Toxicity to reproduction/Fertility**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Reproduction/developmental toxicity screening test - Rat, male and female, Oral  
  
General Toxicity - Parent NOAEL: 1,000 mg/kg bw/day  
Fertility NOEL: 1,000 mg/kg bw/day  
  
General Toxicity F1 NOEL: 1,000 mg/kg bw/day  
  
OECD Test Guideline 422  
Gavage, Highest dose tested, no impairment of fertility has been observed,  
Unpublished reports

**Developmental Toxicity/Teratogenicity**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Pre-natal - Rabbit, female, Oral

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General Toxicity Maternal NOAEL: 300 mg/kg bw/day

Developmental Toxicity NOAEL F1: 300 mg/kg bw/day

Method: OECD Test Guideline 414

Gavage, Teratogenic effects have been observed, Unpublished internal reports

**STOT**

**STOT - single exposure**

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

The substance or mixture is not classified as specific target organ toxicant, single exposure according to GHS criteria.  
internal evaluation

**STOT - repeated exposure**

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

The substance or mixture is not classified as specific target organ toxicant, repeated exposure according to GHS criteria.  
internal evaluation

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

Oral 5 Weeks - Rat , male and female  
NOAEL: 1000 mg/kg  
Method: OECD Test Guideline 422  
Gavage  
Highest dose tested  
No systemic toxicity observed.  
Unpublished reports

Inhalation (aerosol) 90-day - Rat , male and female  
NOAEC: > 5 mg/l  
Method: OECD Test Guideline 413  
Highest dose tested  
No significant adverse effects were reported  
Unpublished reports

**Experience with human exposure**

No data available

**CMR effects**

**Teratogenicity**

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

Classified as toxic for the reproduction in Category 2 (development) according to GHS criteria

**Aspiration toxicity**

No data available

**SECTION 12: Ecological information**

**12.1 Toxicity**

**Aquatic Compartment**

**Acute toxicity to fish**

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

LC50 - 96 h : 16,700 mg/l - Pimephales promelas (fathead minnow)  
flow-through test  
Analytical monitoring: yes

Method: according to a standardised method  
Not harmful to fish (LC/LL50 > 100 mg/L)  
Published data

**Acute toxicity to daphnia and other aquatic invertebrates**

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2,2-dimethyl-1,3-dioxolan-4-ylmethanol EC50 - 48 h : > 96 mg/l - *Daphnia magna* (Water flea)  
static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 202  
Not harmful to aquatic invertebrates. (EC/EL50 > 100 mg/L)  
Highest concentration tested  
Unpublished reports

EC50 - 48 h : 4,600 mg/l - *Daphnia magna* (Water flea)  
static test  
Analytical monitoring: yes  
Method: OECD Test Guideline 202  
Not harmful to aquatic invertebrates. (EC/EL50 > 100 mg/L)  
Unpublished reports

**Toxicity to aquatic plants**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol ErC50 - 72 h : > 92 mg/l - *Pseudokirchneriella subcapitata* (green algae)  
static test  
Analytical monitoring: yes  
End point: Growth rate  
Method: OECD Test Guideline 201  
Not harmful to algae (EC/EL50 > 100 mg/L)  
Highest concentration tested  
Unpublished reports

NOEC - 72 h : 92 mg/l - *Pseudokirchneriella subcapitata* (green algae)  
static test  
Analytical monitoring: yes  
End point: Growth rate  
Method: OECD Test Guideline 201  
No adverse chronic effect observed up to and including the threshold of 1 mg/L.  
Highest concentration tested  
Unpublished reports

ErC50 - 72 h : 15,000 mg/l - *Raphidocelis subcapitata* (freshwater green alga)  
static test  
End point: Growth rate  
Method: OECD Test Guideline 201  
Not harmful to algae (EC/EL50 > 100 mg/L)  
Unpublished reports

NOEC - 72 h : 940 mg/l - *Raphidocelis subcapitata* (freshwater green alga)  
static test  
End point: Growth rate  
Method: OECD Test Guideline 201  
No adverse chronic effect observed up to and including the threshold of 1 mg/L.  
Unpublished reports

**Toxicity to microorganisms**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol - 3 h : - activated sludge  
static test  
End point: Respiration inhibition  
  
EC50 : > 1,000 mg/l  
  
EC10 : > 1,000 mg/l  
  
Analytical monitoring: no  
Method: OECD Test Guideline 209  
Unpublished reports

**Chronic toxicity to fish** No data available

**Chronic toxicity to daphnia and other aquatic invertebrates**

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2,2-dimethyl-1,3-dioxolan-4-ylmethanol NOEC: 10 mg/l - 21 Days - Daphnia magna (Water flea)  
semi-static test  
Analytical monitoring: yes  
End point: Reproduction  
Method: OECD Test Guideline 211  
No adverse chronic effect observed up to and including the threshold of 1 mg/L.  
Unpublished reports

**Terrestrial Compartment**

**Toxicity to soil dwelling organisms**

2,2-dimethyl-1,3-dioxolan-4-ylmethanol NOEC: 250 mg/kg - 56 Days - Eisenia fetida (earthworms)  
End point: Reproduction  
Method: OECD Test Guideline 222  
Unpublished reports  
  
EC10: 1,250 mg/kg - 28 Days - soil micro-organisms  
End point: Nitrogen transformation  
Method: OECD Test Guideline 216  
Unpublished reports

**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**

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

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

2,2-dimethyl-1,3-dioxolan-4-ylmethanol This substance is not considered to be persistent, bioaccumulating and toxic (PBT).  
This substance is not considered to be very persistent and very bioaccumulating (vPvB).

**12.6 Other adverse effects**

**Ecotoxicity assessment**

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

2,2-dimethyl-1,3-dioxolan-4-ylmethanol Not harmful to aquatic life (LC/LL50, EC/EL50 > 100 mg/L)

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

2,2-dimethyl-1,3-dioxolan-4-ylmethanol No adverse chronic effect observed up to and including the threshold of 1 mg/L.

**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.

**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 (AIIIC)                                     | - 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. |
| 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                                      |

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|                                                        |                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        | 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.                                                                                        |
| Korea. Act on Registration and Evaluation of Chemicals | - When purchased from a Solvay legal entity based in Korea, this product is compliant with "Act on Registration and Evaluation of Chemicals" (AREC or K-REACH, Article 10) as all its components are either excluded, exempt, and/or (pre)registered. When purchased from a legal entity outside of Korea, please contact your local representative for additional information. |

**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.
- H361d: Suspected of damaging the unborn child.

**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

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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.

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**Annex**  
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**ES1: Consumer use, Use into insect repellent products**

**1.1. Title section**

|                                              |                                                                                    |            |
|----------------------------------------------|------------------------------------------------------------------------------------|------------|
| <b>Structured Short Title</b> : Consumer use |                                                                                    |            |
| <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 |

**1.2. Conditions of use affecting exposure**

**1.2.1. 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. |

**1.2.2. 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> |              |
| <b>General measures (eye irritants)</b>                                                      |              |
| 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 |

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

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|                                                                                              |               |
|----------------------------------------------------------------------------------------------|---------------|
| <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                                                                        | : Outdoor use |

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

**1.3.1. 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                            | 0.00316 mg/L (EUSES v2.1)                | 0.016  |
| Freshwater sediment                   | 0.017 mg/kg dry weight (EUSES v2.1)      | 0.014  |
| Marine water                          | 0.000243 mg/L (EUSES v2.1)               | < 0.01 |
| Marine sediment                       | 0.00131 mg/kg dry weight (EUSES v2.1)    | 0.011  |
| Sewage treatment plant                | 0.016 mg/L (EUSES v2.1)                  | < 0.01 |
| Agricultural soil                     | 0.009 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            | 0.000833 mg/kg bw/day (EUSES v2.1)       | < 0.01 |
| Man via environment - combined routes |                                          | < 0.01 |

**1.3.2. 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 |

**1.3.3. 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 |

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|                 |          |           |  |        |
|-----------------|----------|-----------|--|--------|
| combined routes | systemic | long-term |  | < 0.01 |
|-----------------|----------|-----------|--|--------|

**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.

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**ES2: Consumer use, Use in paint**

**2.1. Title section**

|                               |                                                           |                |
|-------------------------------|-----------------------------------------------------------|----------------|
| <b>Structured Short Title</b> |                                                           | : Consumer use |
| <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,          |

**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) / 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 |

**2.2.2. 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                                          |

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|                  |          |
|------------------|----------|
| Ventilation rate | : >= 0.6 |
|------------------|----------|

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

|                                                                          |                                                    |
|--------------------------------------------------------------------------|----------------------------------------------------|
| <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> |                                                    |
| Amount per Application                                                   | : <= 1650 g/event                                  |
| Exposure frequency                                                       | : 1 events/day                                     |
| Use frequency                                                            | : Infrequent                                       |
| Duration                                                                 | : Application duration <= 60 min                   |
| Duration                                                                 | : Inhalation exposure duration per event <= 60 min |
| <b>Other conditions affecting consumers exposure</b>                     |                                                    |
| Room size                                                                | : >= 34 m3                                         |
| Ventilation rate                                                         | : >= 1.5                                           |

**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) / Consumer use ()**

| Compartment                           | Exposure level                        | RCR    |
|---------------------------------------|---------------------------------------|--------|
| Freshwater                            | 0.0059 mg/L (EUSES v2.1)              | 0.03   |
| Freshwater sediment                   | 0.032 mg/kg dry weight (EUSES v2.1)   | 0.027  |
| Marine water                          | 0.000518 mg/L (EUSES v2.1)            | < 0.01 |
| Marine sediment                       | 0.00278 mg/kg dry weight (EUSES v2.1) | 0.024  |
| Sewage treatment plant                | 0.044 mg/L (EUSES v2.1)               | < 0.01 |
| Agricultural soil                     | 0.00924 mg/kg dry weight (EUSES v2.1) | < 0.01 |
| Man via environment - Inhalation      | 0.0000758 mg/m³ (EUSES v2.1)          | < 0.01 |
| Man via environment - Oral            | 0.000851 mg/kg bw/day (EUSES v2.1)    | < 0.01 |
| Man via environment - combined routes |                                       | < 0.01 |

**2.3.2. 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 |
|----------------|---------------|--------------------|----------------|-----|
|----------------|---------------|--------------------|----------------|-----|

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

**2.3.3. 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<br>bw/day (ConsExpo<br>web 1.1.0) | < 0.01 |
| inhalative      | systemic      | long-term          | 0.009 mg/m <sup>3</sup><br>(ConsExpo web 1.1.0)  | < 0.01 |
| combined routes | systemic      | long-term          |                                                  | < 0.01 |

**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.

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**ES3: Formulation or re-packing, Industrial formulation of homecare products**

**3.1. 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,             |

**3.2. Conditions of use affecting exposure**

**3.2.1. 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<br>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                                                               |

**3.2.2. 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 |

**3.2.3. 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)**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**3.2.4. 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                       |                                       |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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 |

**3.2.5. 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 |

**3.2.6. 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) ()**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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<br>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 |

**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) / 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.                    |                                          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**3.2.8. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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)                                                             |                                           |
| 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: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

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

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Amount used, 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<br>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 |

**3.2.10. 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<br>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<br>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.                                                                 |                                        |

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|                                                                                     |                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------|
| Wear suitable gloves tested to EN374.<br>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 |

**3.2.11. 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<br>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)<br>Use suitable eye protection.                             |                                           |
| Wear suitable gloves tested to EN374.<br>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 |

**3.2.12. 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> |          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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<br>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 |

**3.2.13. 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<br>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>                                           |                                        |

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

**3.2.14. 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 |

**3.2.15. 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.  |                                          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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 |

**3.2.16. 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 |

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

**3.3.1. 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 |

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|                                       |                                      |        |
|---------------------------------------|--------------------------------------|--------|
| 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  |

**3.3.2. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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 |

**3.3.3. 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><br>(ECETOC TRA worker v3)                          | 0.018 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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 |

**3.3.4. 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><br>(ECETOC TRA worker v3) | 0.055 |

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|                 |          |           |                                                                            |       |
|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| dermal          | systemic | long-term | 0.138 mg/kg bw/day<br>(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 |

**3.3.5. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.372 mg/kg bw/day<br>(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  |

**3.3.6. 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><br>(ECETOC TRA worker v3)                           | < 0.01 |
| dermal          | systemic      | long-term          | 0.69 mg/kg bw/day<br>(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  |

**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) / Sample collection ()**

| Exposure route | Health effect | Exposure indicator | Exposure level                                                             | RCR   |
|----------------|---------------|--------------------|----------------------------------------------------------------------------|-------|
| inhalative     | systemic      | long-term          | 1.652 mg/m <sup>3</sup><br>(ECETOC TRA worker v3)                          | 0.028 |
| dermal         | systemic      | long-term          | 0.138 mg/kg bw/day<br>(ECETOC TRA worker v3)                               | 0.014 |
| dermal         | local         | long-term          | (Risk management measures are based on qualitative risk characterisation.) |       |

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|                 |          |           |                                        |       |
|-----------------|----------|-----------|----------------------------------------|-------|
|                 |          |           | on qualitative risk characterisation.) |       |
| combined routes | systemic | long-term |                                        | 0.041 |

**3.3.8. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.068 mg/kg bw/day<br>(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  |

**3.3.9. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 2.742 mg/kg bw/day<br>(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  |

**3.3.10. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 2.742 mg/kg bw/day<br>(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  |

**3.3.11. 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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|                 |          |           |                                                                            |       |
|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| inhalative      | systemic | long-term | 1.101 mg/m <sup>3</sup><br>(ECETOC TRA worker v3)                          | 0.018 |
| dermal          | systemic | long-term | 2.742 mg/kg bw/day<br>(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 |

**3.3.12. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.686 mg/kg bw/day<br>(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 |

**3.3.13. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 1.372 mg/kg bw/day<br>(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 |

**3.3.14. 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><br>(ECETOC TRA worker v3) | 0.11  |
| dermal         | systemic      | long-term          | 0.548 mg/kg bw/day<br>(ECETOC TRA worker v3)      | 0.055 |
| dermal         | local         | long-term          | (Risk management                                  |       |

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|                 |          |           |                                                           |       |
|-----------------|----------|-----------|-----------------------------------------------------------|-------|
|                 |          |           | measures are based on qualitative risk characterisation.) |       |
| combined routes | systemic | long-term |                                                           | 0.165 |

**3.3.15. 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><br>(ECETOC TRA worker v3)                        | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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 |

**3.3.16. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.37 mg/kg bw/day<br>(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  |

**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.

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**ES4: Widespread use by professional workers, Professional uses as polishes and wax blends**

**4.1. Title section**

|                               |                                          |
|-------------------------------|------------------------------------------|
| <b>Structured Short Title</b> | : Widespread use by professional workers |
|-------------------------------|------------------------------------------|

|                    |                                                                      |             |
|--------------------|----------------------------------------------------------------------|-------------|
| <b>Environment</b> |                                                                      |             |
| <b>CS1</b>         | <b>Polishes and wax blends</b>                                       | ERC8a, PC31 |
| <b>Worker</b>      |                                                                      |             |
| <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,     |

**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) / Polishes and wax blends (PC31)**

|                                                                                        |                                     |
|----------------------------------------------------------------------------------------|-------------------------------------|
| <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                                                                  | : <= 0.15 kg                        |
| Maximum daily local emission to waste water                                            | : 0.15 kg                           |
| <b>Conditions and measures related to sewage treatment plant</b>                       |                                     |
| STP type                                                                               | : Biological Sewage Treatment Plant |
| STP<br>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.  |

**4.2.2. Control of worker exposure: Roller application or brushing (PROC10) / Floor care products; polish/impregnating agent ()**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Product (article) characteristics</b>                                                     |                                           |
| Covers percentage substance in the product up to 1 %.                                        |                                           |
| Physical form of product                                                                     | : Liquid                                  |
| <b>Amount used, 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 |

**4.2.3. 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.                                    |                                          |

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|                                                    |                                           |
|----------------------------------------------------|-------------------------------------------|
| <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: Roller application or brushing (PROC10) / Maintenance products; furniture and leather care 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 <= 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> |                                           |
| 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 |

**4.2.5. Control of worker exposure: Non-industrial spraying (PROC11) / Maintenance products; furniture and leather care products ()**

|                                                                          |                                          |
|--------------------------------------------------------------------------|------------------------------------------|
| <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>              |                                          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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 |

**4.2.6. 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 |

**4.2.7. 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 ()**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Product (article) characteristics</b>                                                     |                                           |
| Covers percentage substance in the product up to 1 %.                                        |                                           |
| Physical form of product                                                                     | : Liquid                                  |
| <b>Amount used, 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 |

**4.2.8. 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> |                                          |

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|                                                           |                                           |
|-----------------------------------------------------------|-------------------------------------------|
| 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 |

**4.2.9. 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> |                                               |
| 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     |

**4.2.10. 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 |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

#### 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) / 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 |

##### 4.3.2. 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><br>(ECETOC TRA worker v3) | 0.229 |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| dermal          | systemic | long-term | 2.743 mg/kg bw/day<br>(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 |

**4.3.3. 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><br>(ECETOC TRA worker v3)                          | 0.184 |
| dermal          | systemic      | long-term          | 0.22 mg/kg bw/day<br>(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 |

**4.3.4. 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><br>(ECETOC TRA worker v3)                           | 0.138 |
| dermal          | systemic      | long-term          | 2.743 mg/kg bw/day<br>(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 |

**4.3.5. 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><br>(ECETOC TRA worker v3)                          | 0.184 |
| dermal          | systemic      | long-term          | 0.631 mg/kg bw/day<br>(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 |

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**4.3.6. 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><br>(ECETOC TRA worker v3)                          | 0.023 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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  |

**4.3.7. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.137 mg/kg bw/day<br>(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  |

**4.3.8. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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   |

**4.3.9. 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><br>(ECETOC TRA worker v3) | 0.138 |

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|                 |          |           |                                                                            |       |
|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| dermal          | systemic | long-term | 2.743 mg/kg bw/day<br>(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 |

**4.3.10. 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><br>(ECETOC TRA worker v3)                          | 0.184 |
| dermal          | systemic      | long-term          | 0.631 mg/kg bw/day<br>(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 |

**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.

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**ES5: Widespread use by professional workers, Professional end-use of washing and cleaning products (IFRA GES 4)**

**5.1. 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,                                  |

**5.2. Conditions of use affecting exposure**

**5.2.1. 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<br>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.  |

**5.2.2. 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 m <sup>2</sup> /h                   |
| Use frequency                                                            | : Duration of the activity <= 4 hours/day |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 $\geq 80\%$                                                   |                                           |
| 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 |

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

**5.3.1. 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 |

### 5.3.2. 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 |

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|                 |          |           |                                                                                     |       |
|-----------------|----------|-----------|-------------------------------------------------------------------------------------|-------|
| dermal          | systemic | long-term | 1.097 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | 0.11  |
| dermal          | local    | long-term | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |       |
| combined routes | systemic | long-term |                                                                                     | 0.168 |

**5.4. 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.

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**ES6: Consumer use, Consumers end-use of washing and cleaning products (IFRA GES 6)**

**6.1. 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       |

**6.2. Conditions of use affecting exposure**

**6.2.1. 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. |

**6.2.2. Control of consumer exposure: Washing and cleaning products (PC35) / Laundry and dish washing products (PC8\_1, PC35\_1)**

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|                                                                          |                                      |
|--------------------------------------------------------------------------|--------------------------------------|
| <b>Product (article) characteristics</b>                                 |                                      |
| Covers percentage substance in the product up to 1 %.                    |                                      |
| 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                                                                 | : Duration of exposure by events 1 h |
| Use frequency                                                            | : Frequent                           |
| <b>Other conditions affecting consumers exposure</b>                     |                                      |
| Indoor or outdoor use                                                    | : Indoor use                         |

**6.2.3. Control of consumer exposure: Washing and cleaning products (PC35) / Surface cleaners (liquid) ()**

|                                                                          |                                         |
|--------------------------------------------------------------------------|-----------------------------------------|
| <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 used per event                                                    | : <= 60 g                               |
| Exposure frequency                                                       | : 1 events/day                          |
| Duration                                                                 | : Duration of exposure by events 0.33 h |
| Use frequency                                                            | : Frequent                              |
| <b>Other conditions affecting consumers exposure</b>                     |                                         |
| Indoor or outdoor use                                                    | : Indoor use                            |

**6.2.4. Control of consumer exposure: Washing and cleaning products (PC35) / Toilet cleaners (liquid) ()**

|                                                                          |                                                   |
|--------------------------------------------------------------------------|---------------------------------------------------|
| <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                                                   | : <= 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                                        |
| <b>Other conditions affecting consumers exposure</b>                     |                                                   |
| Indoor or outdoor use                                                    | : Indoor use                                      |

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|                  |             |
|------------------|-------------|
| Room size        | : >= 2.5 m3 |
| Ventilation rate | : >= 2      |

**6.2.5. 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                                            |

**6.2.6. 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     |

**6.2.7. 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<br>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       |

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|                                                      |                                         |
|------------------------------------------------------|-----------------------------------------|
| Duration                                             | : Duration of exposure by events <= 5 h |
| Use frequency                                        | : Infrequent                            |
| <b>Other conditions affecting consumers exposure</b> |                                         |
| Indoor or outdoor use                                | : Indoor use                            |

**6.2.8. 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 m <sup>3</sup>                             |
| Ventilation rate                                                         | : >= 2.5                                           |

**6.2.9. 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                         |

**6.2.10. Control of consumer exposure: Washing and cleaning products (PC35) / Surface care, trigger sprays ()**

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|                                                                          |                                      |
|--------------------------------------------------------------------------|--------------------------------------|
| <b>Product (article) characteristics</b>                                 |                                      |
| Covers the percentage of the substance in the product up to 0,998 %      |                                      |
| 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                         |

**6.2.11. Control of consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Liquids (PC24\_1)**

|                                                                          |                                         |
|--------------------------------------------------------------------------|-----------------------------------------|
| <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                                                   | : <= 60 g/event                         |
| Exposure frequency                                                       | : 1 events/day                          |
| Duration                                                                 | : Duration of exposure by events 0.33 h |
| Use frequency                                                            | : Frequent                              |
| <b>Other conditions affecting consumers exposure</b>                     |                                         |
| Indoor or outdoor use                                                    | : Indoor use                            |

**6.2.12. Control of consumer exposure: Washing and cleaning products (PC35) / Kitchen cleaner () / Sprays (PC24\_3)**

|                                                                          |                                      |
|--------------------------------------------------------------------------|--------------------------------------|
| <b>Product (article) characteristics</b>                                 |                                      |
| Covers concentrations up to 0.5 %                                        |                                      |
| 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>                     |                                      |

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Indoor or outdoor use : Indoor use

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

**6.3.1. 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 |

### 6.3.2. 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 |

### 6.3.3. 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  |

### 6.3.4. 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 (ConsExpo web)              | < 0.01 |

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|-----------------|----------|-----------|--------|--------|
|                 |          |           | 1.1.0) |        |
| combined routes | systemic | long-term |        | < 0.01 |

**6.3.5. 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><br>(ConsExpo web 1.1.0) | < 0.01 |
| dermal          | systemic      | long-term          | 0.295 mg/kg bw/day<br>(ConsExpo web 1.1.0)       | 0.059  |
| oral            | systemic      | long-term          | 0.033 mg/kg bw/day<br>(ConsExpo web 1.1.0)       | < 0.01 |
| combined routes | systemic      | long-term          |                                                  | 0.066  |

**6.3.6. 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<br>(AISE REACT) | 0.286 |

**6.3.7. 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><br>(ECETOC TRA consumer v3) | 0.417 |
| dermal          | systemic      | long-term          | 1.429 mg/kg bw/day<br>(ECETOC TRA consumer v3)     | 0.286 |
| combined routes | systemic      | long-term          |                                                    | 0.702 |

**6.3.8. 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><br>(ConsExpo web 1.1.0) | < 0.01 |
| dermal          | systemic      | long-term          | 0.00164 mg/kg bw/day<br>(ConsExpo web 1.1.0)       | < 0.01 |
| combined routes | systemic      | long-term          |                                                    | < 0.01 |

**6.3.9. 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><br>(ECETOC TRA consumer v3) | 0.343 |
| dermal         | systemic      | long-term          | 1.429 mg/kg bw/day                                  | 0.286 |

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|-----------------|----------|-----------|--------------------------|-------|
|                 |          |           | (ECETOC TRA consumer v3) |       |
| combined routes | systemic | long-term |                          | 0.629 |

**6.3.10. 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><br>(ECETOC TRA consumer v3) | 0.342 |
| dermal          | systemic      | long-term          | 1.426 mg/kg bw/day<br>(ECETOC TRA consumer v3)      | 0.285 |
| combined routes | systemic      | long-term          |                                                     | 0.628 |

**6.3.11. 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<br>(AISE REACT)    | 0.286  |
| combined routes | systemic      | long-term          |                                      | 0.288  |

**6.3.12. 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><br>(ECETOC TRA consumer v3) | 0.172 |
| dermal          | systemic      | long-term          | 0.715 mg/kg bw/day<br>(ECETOC TRA consumer v3)      | 0.143 |
| combined routes | systemic      | long-term          |                                                     | 0.314 |

**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.

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**ES7: Consumer use, Consumer end-use of air care products (IFRA GES 7)**

**7.1. 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, |

**7.2. Conditions of use affecting exposure**

**7.2.1. 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. |

**7.2.2. 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<br>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 |

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|                                                      |              |
|------------------------------------------------------|--------------|
| Use frequency                                        | : Frequent   |
| <b>Other conditions affecting consumers exposure</b> |              |
| Indoor or outdoor use                                | : Indoor use |

**7.2.3. 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                                           |

**7.2.4. 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            |

**7.2.5. 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            |

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

#### 7.3.1. 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 |

#### 7.3.2. 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 |

#### 7.3.3. 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 |

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|-----------------|----------|-----------|-----------------------------------------|--------|
|                 |          |           | (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  |

**7.3.4. 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  |

**7.3.5. 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  |

**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.

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**ES8: Consumer use, Consumers end-use polishes and wax blends (IFRA GES 9)**

**8.1. Title section**

|                                              |                                                        |                      |
|----------------------------------------------|--------------------------------------------------------|----------------------|
| <b>Structured Short Title</b> : Consumer use |                                                        |                      |
| <b>Environment</b>                           |                                                        |                      |
| <b>CS1</b>                                   | <b>End-uses of polish and wax blends</b>               | ERC8a,               |
| <b>Consumer</b>                              |                                                        |                      |
| <b>CS2</b>                                   | <b>Polishes, wax / cream (floor, furniture, shoes)</b> | PC31_1               |
| <b>CS3</b>                                   | <b>Polishes, spray (furniture, shoes)</b>              | PC31, PC23_2, PC31_2 |

**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, 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. |

**8.2.2. 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                         |

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**8.2.3. Control of consumer exposure: Polishes and wax blends (PC31) / Polishes, spray (furniture, shoes) (PC23\_2, PC31\_2)**

|                                                                          |                                      |
|--------------------------------------------------------------------------|--------------------------------------|
| <b>Product (article) characteristics</b>                                 |                                      |
| Covers concentrations up to 0.1 %                                        |                                      |
| Physical form of product                                                 | : Sprays                             |
| <b>Amount used, frequency and duration of use (or from service life)</b> |                                      |
| Amount per Application                                                   | : <= 135 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                         |

**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, 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 |

**8.3.2. 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 |

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|-----------------|----------|-----------|--|-------|
| combined routes | systemic | long-term |  | 0.568 |
|-----------------|----------|-----------|--|-------|

**8.3.3. 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><br>(ECETOC TRA<br>consumer v3) | 0.132 |
| dermal          | systemic      | long-term          | 0.143 mg/kg bw/day<br>(ECETOC TRA<br>consumer v3)      | 0.029 |
| combined routes | systemic      | long-term          |                                                        | 0.161 |

**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.

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**ES9: Formulation or re-packing, Industrial formulation of personal care products**

**9.1. Title section**

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

|                    |                                                                                                       |                    |
|--------------------|-------------------------------------------------------------------------------------------------------|--------------------|
| <b>Environment</b> |                                                                                                       |                    |
| <b>CS1</b>         | <b>Industrial formulation of personal care 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,             |

**9.2. Conditions of use affecting exposure**

**9.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation of personal care products ()**

|                                                                          |            |
|--------------------------------------------------------------------------|------------|
| <b>Amount used, frequency and duration of use (or from service life)</b> |            |
| 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      |
| <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<br>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                                                               |

**9.2.2. 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 |

**9.2.3. 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)**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**9.2.4. 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                       |                                       |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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 |

**9.2.5. 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 |

**9.2.6. 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) ()**

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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<br>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 |

**9.2.7. 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.                    |                                          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**9.2.8. Control of worker exposure: Use as laboratory reagent (PROC15) / Laboratory activities (CS36)**

|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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)                                                             |                                           |
| 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 |

**9.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Bulk transfers (CS14) / Drum/batch transfers (CS8)**

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

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Amount used, 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<br>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 |

**9.2.10. 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<br>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<br>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.                                                                 |                                        |

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|                                                                                                                                                  |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of $\geq 80\%$<br>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 |

**9.2.11. 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<br>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)<br>Use suitable eye protection.<br>Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of $\geq 80\%$<br>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 |

**9.2.12. 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> |          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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<br>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 |

**9.2.13. 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<br>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>                                           |                                        |

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

**9.2.14. 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 |

**9.2.15. 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.  |                                          |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| 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 |

**9.2.16. 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 |

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

**9.3.1. 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 |

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|                                       |                                        |        |
|---------------------------------------|----------------------------------------|--------|
| 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  |

**9.3.2. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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 |

**9.3.3. 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><br>(ECETOC TRA worker v3)                          | 0.018 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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 |

**9.3.4. 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><br>(ECETOC TRA) | 0.055 |

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|                 |          |           |                                                                                     |       |
|-----------------|----------|-----------|-------------------------------------------------------------------------------------|-------|
|                 |          |           | worker v3)                                                                          |       |
| dermal          | systemic | long-term | 0.138 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | 0.014 |
| dermal          | local    | long-term | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |       |
| combined routes | systemic | long-term |                                                                                     | 0.069 |

**9.3.5. 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><br>(ECETOC TRA<br>worker v3)                                | < 0.01 |
| dermal          | systemic      | long-term          | 1.372 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | 0.137  |
| dermal          | local         | long-term          | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |        |
| combined routes | systemic      | long-term          |                                                                                     | 0.146  |

**9.3.6. 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><br>(ECETOC TRA<br>worker v3)                                 | < 0.01 |
| dermal          | systemic      | long-term          | 0.69 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                      | 0.069  |
| dermal          | local         | long-term          | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |        |
| combined routes | systemic      | long-term          |                                                                                     | 0.075  |

**9.3.7. 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><br>(ECETOC TRA<br>worker v3) | 0.028 |
| dermal         | systemic      | long-term          | 0.138 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)      | 0.014 |
| dermal         | local         | long-term          | (Risk management                                     |       |

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|                 |          |           |                                                           |       |
|-----------------|----------|-----------|-----------------------------------------------------------|-------|
|                 |          |           | measures are based on qualitative risk characterisation.) |       |
| combined routes | systemic | long-term |                                                           | 0.041 |

**9.3.8. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.068 mg/kg bw/day<br>(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  |

**9.3.9. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 2.742 mg/kg bw/day<br>(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  |

**9.3.10. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 2.742 mg/kg bw/day<br>(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  |

**9.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Transfer from/pouring from containers (CS22) / Manual (CS34)**

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

**9.3.12. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.686 mg/kg bw/day<br>(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 |

**9.3.13. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 1.372 mg/kg bw/day<br>(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 |

**9.3.14. 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><br>(ECETOC TRA worker v3) | 0.055 |
| dermal         | systemic      | long-term          | 0.274 mg/kg bw/day<br>(ECETOC TRA worker v3)      | 0.027 |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| dermal          | local    | long-term | (Risk management measures are based on qualitative risk characterisation.) |       |
| combined routes | systemic | long-term |                                                                            | 0.082 |

**9.3.15. 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><br>(ECETOC TRA worker v3)                        | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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 |

**9.3.16. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.37 mg/kg bw/day<br>(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  |

**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.

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**ES10: Formulation or re-packing, Industrial formulation of personal care end-products**

**10.1. Title section**

|                                                           |                                                                                                   |         |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------|
| <b>Structured Short Title</b> : Formulation or re-packing |                                                                                                   |         |
| <b>Environment</b>                                        |                                                                                                   |         |
| <b>CS1</b>                                                | <b>Industrial formulation end-products</b>                                                        | ERC2,   |
| <b>Worker</b>                                             |                                                                                                   |         |
| <b>CS2</b>                                                | <b>Uploading/unloading</b>                                                                        | PROC8b, |
| <b>CS3</b>                                                | <b>Sampling of received goods</b>                                                                 | PROC2,  |
| <b>CS4</b>                                                | <b>Quality control of received goods</b>                                                          | PROC15, |
| <b>CS5</b>                                                | <b>Storage</b>                                                                                    | PROC1,  |
| <b>CS6</b>                                                | <b>Closed system mixing including filling process equipment</b>                                   | PROC3,  |
| <b>CS7</b>                                                | <b>Batch mixing with significant contact including filling process</b>                            | PROC5,  |
| <b>CS8</b>                                                | <b>Maintenance and cleaning</b>                                                                   | PROC8a, |
| <b>CS9</b>                                                | <b>Sampling of compounds</b>                                                                      | PROC2,  |
| <b>CS10</b>                                               | <b>Quality control of compounds</b>                                                               | PROC15, |
| <b>CS11</b>                                               | <b>Charging/discharging from/to vessels/large</b>                                                 | PROC8b, |
| <b>CS12</b>                                               | <b>Transfer in a small containers</b>                                                             | PROC9,  |
| <b>CS13</b>                                               | <b>Production of preparations or articles by tableting, compression, extrusion, pelletisation</b> | PROC14  |

**10.2. Conditions of use affecting exposure**

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

|                                                                          |                                                                             |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Amount used, frequency and duration of use (or from service life)</b> |                                                                             |
| 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                                                                   |
| <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                                                                |

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| STP<br>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                      |

**10.2.2. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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) / 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 |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Technical and organisational conditions and measures</b>                                                                                                                                                                                                                                                   |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                                                                                  |                                           |
| General measures (eye irritants)<br>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: 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>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 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 |

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|                                                                                                                                                                                                                                                                                                  |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Use in closed process, no likelihood of exposure<br>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 |

**10.2.6. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced.<br>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 |

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**10.2.7. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**10.2.8. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                    |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                    |
| General measures (eye irritants)<br>Use suitable eye protection.<br>For further specification, refer to section 8 of the SDS.                                                                                                                |                                    |

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|----------------------------------------------------|-------------------------------------------|
| <b>Other conditions affecting workers exposure</b> |                                           |
| Indoor or outdoor use                              | : Indoor use                              |
| Temperature                                        | : Assumes process temperature up to 40 °C |

**10.2.9. 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 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.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**10.2.10. 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 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                       |

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|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**10.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**10.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

|                                                                          |                                    |
|--------------------------------------------------------------------------|------------------------------------|
| <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 |

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|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Technical and organisational conditions and measures</b>                                                                                                                                                                                  |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**10.2.13. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

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

**10.3.1. 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 |

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|                                       |                                        |        |
|---------------------------------------|----------------------------------------|--------|
| 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  |

**10.3.2. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |        |

**10.3.3. 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><br>(ECETOC TRA worker v3)                           | < 0.01 |
| dermal          | systemic      | long-term          | 0.822 mg/kg bw/day<br>(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.) |        |

**10.3.4. 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><br>(ECETOC TRA worker v3) | 0.028 |
| dermal         | systemic      | long-term          | 0.204 mg/kg bw/day                                | 0.02  |

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|                 |          |           |                                                                            |       |
|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
|                 |          |           | (ECETOC TRA worker v3)                                                     |       |
| combined routes | systemic | long-term |                                                                            | 0.048 |
| dermal          | local    | long-term | (Risk management measures are based on qualitative risk characterisation.) |       |

**10.3.5. 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><br>(ECETOC TRA worker v3)                        | < 0.01 |
| dermal          | systemic      | long-term          | 0.02 mg/kg bw/day<br>(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.) |        |

**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) / 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><br>(ECETOC TRA worker v3)                          | 0.099 |
| dermal          | systemic      | long-term          | 0.414 mg/kg bw/day<br>(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.) |       |

**10.3.7. 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><br>(ECETOC TRA worker v3) | 0.028 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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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|  |  |  |                                        |  |
|--|--|--|----------------------------------------|--|
|  |  |  | on qualitative risk characterisation.) |  |
|--|--|--|----------------------------------------|--|

**10.3.8. 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><br>(ECETOC TRA worker v3)                          | 0.055 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**10.3.9. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.137 mg/kg bw/day<br>(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.) |        |

**10.3.10. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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.) |        |

**10.3.11. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic | long-term | 1.371 mg/kg bw/day<br>(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.) |        |

**10.3.12. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.686 mg/kg bw/day<br>(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.) |        |

**10.3.13. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.343 mg/kg bw/day<br>(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.) |       |

**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

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- 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: Consumer use, End use of cosmetic products**

**11.1. 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,  |

**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) / 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. |

**11.2.2. 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   |

**11.2.3. Control of consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()**

|                                          |
|------------------------------------------|
| <b>Product (article) characteristics</b> |
|------------------------------------------|

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|                                                                          |                |
|--------------------------------------------------------------------------|----------------|
| 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   |

### 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) / 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 |

#### 11.3.2. 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. |

#### 11.3.3. 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. |

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

Environment

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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.

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**ES12: Formulation or re-packing, Industrial formulation of cosmetics compounds**

**12.1. Title section**

|                                                           |                                                                        |             |
|-----------------------------------------------------------|------------------------------------------------------------------------|-------------|
| <b>Structured Short Title</b> : Formulation or re-packing |                                                                        |             |
| <b>Environment</b>                                        |                                                                        |             |
| <b>CS1</b>                                                | <b>Formulation</b>                                                     | ERC2, SU 10 |
| <b>Worker</b>                                             |                                                                        |             |
| <b>CS2</b>                                                | <b>Uploading/unloading</b>                                             | PROC8b,     |
| <b>CS3</b>                                                | <b>Sampling of received goods</b>                                      | PROC2,      |
| <b>CS4</b>                                                | <b>Quality control of received goods</b>                               | PROC15,     |
| <b>CS5</b>                                                | <b>Storage</b>                                                         | PROC1,      |
| <b>CS6</b>                                                | <b>Closed system mixing including filling process equipment</b>        | PROC3,      |
| <b>CS7</b>                                                | <b>Batch mixing with significant contact including filling process</b> | PROC5,      |
| <b>CS8</b>                                                | <b>Maintenance and cleaning</b>                                        | PROC8a,     |
| <b>CS9</b>                                                | <b>Sampling of compounds</b>                                           | PROC2,      |
| <b>CS10</b>                                               | <b>Quality control of compounds</b>                                    | PROC15,     |
| <b>CS11</b>                                               | <b>Charging/discharging from/to vessels/large</b>                      | PROC8b,     |
| <b>CS12</b>                                               | <b>Transfer in a small containers</b>                                  | PROC9,      |

**12.2. Conditions of use affecting exposure**

**12.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Formulation (SU 10)**

|                                                                          |                                                                             |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Amount used, frequency and duration of use (or from service life)</b> |                                                                             |
| 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                                                                     |
| <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                                                                      |                                                                             |

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|                                                                                        |                                    |
|----------------------------------------------------------------------------------------|------------------------------------|
| 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                      |

**12.2.2. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**12.2.3. 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>              |                                       |

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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

**12.2.4. 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

**12.2.5. 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)**

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|                                                                                                                                                                                                                                                                                                  |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Use in closed process, no likelihood of exposure<br>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 |

**12.2.6. 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>                                                                                                                                                                                                                                              |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced.<br>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 |

**12.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5) / Batch mixing with significant contact including filling process ()**

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|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**12.2.8. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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                       |

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|             |                                           |
|-------------|-------------------------------------------|
| Temperature | : Assumes process temperature up to 40 °C |
|-------------|-------------------------------------------|

**12.2.9. 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.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                                                                                  |                                           |
| General measures (eye irritants)<br>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 |

**12.2.10. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                       |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                       |
| General measures (eye irritants)<br>For further specification, refer to section 8 of the SDS.                                                                                                                                                |                                       |

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|                                                    |                                           |
|----------------------------------------------------|-------------------------------------------|
| <b>Other conditions affecting workers exposure</b> |                                           |
| Indoor or outdoor use                              | : Indoor use                              |
| Temperature                                        | : Assumes process temperature up to 40 °C |

**12.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**12.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

|                                                                                                                                                                                                                                              |                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                    |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

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

#### 12.3.1. 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 |

#### 12.3.2. 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.) |        |

#### 12.3.3. 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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|                 |          |           |                                                                            |        |
|-----------------|----------|-----------|----------------------------------------------------------------------------|--------|
| inhalative      | systemic | long-term | 0.551 mg/m <sup>3</sup><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic | long-term | 1.37 mg/kg bw/day<br>(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.) |        |

**12.3.4. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.34 mg/kg bw/day<br>(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.) |       |

**12.3.5. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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.) |        |

**12.3.6. 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><br>(ECETOC TRA worker v3) | 0.165 |
| dermal         | systemic      | long-term          | 0.69 mg/kg bw/day<br>(ECETOC TRA worker v3)       | 0.069 |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| combined routes | systemic | long-term |                                                                            | 0.234 |
| dermal          | local    | long-term | (Risk management measures are based on qualitative risk characterisation.) |       |

**12.3.7. 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><br>(ECETOC TRA worker v3)                          | 0.028 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**12.3.8. 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><br>(ECETOC TRA worker v3)                          | 0.055 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**12.3.9. 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><br>(ECETOC TRA worker v3)                           | < 0.01 |
| dermal          | systemic      | long-term          | 0.822 mg/kg bw/day<br>(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.) |        |

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**12.3.10. 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><br>(ECETOC TRA worker v3)                          | 0.028 |
| dermal          | systemic      | long-term          | 0.204 mg/kg bw/day<br>(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.) |       |

**12.3.11. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |        |

**12.3.12. 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><br>(ECETOC TRA worker v3)                          | 0.055 |
| dermal          | systemic      | long-term          | 4.116 mg/kg bw/day<br>(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.) |       |

**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)

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- 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.

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**ES13: Formulation or re-packing, Industrial, Formulation of fragranced end-products (IFRA GES 2)**

**13.1. Title section**

|                                                           |                                                                                                   |         |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------|
| <b>Structured Short Title</b> : Formulation or re-packing |                                                                                                   |         |
| <b>Environment</b>                                        |                                                                                                   |         |
| <b>CS1</b>                                                | <b>Industrial formulation end-products</b>                                                        | ERC2,   |
| <b>Worker</b>                                             |                                                                                                   |         |
| <b>CS2</b>                                                | <b>Uploading/unloading</b>                                                                        | PROC8b, |
| <b>CS3</b>                                                | <b>Sampling of received goods</b>                                                                 | PROC2,  |
| <b>CS4</b>                                                | <b>Quality control of received goods</b>                                                          | PROC15, |
| <b>CS5</b>                                                | <b>Storage</b>                                                                                    | PROC1,  |
| <b>CS6</b>                                                | <b>Closed system mixing including filling process equipment</b>                                   | PROC3,  |
| <b>CS7</b>                                                | <b>Batch mixing with significant contact including filling process</b>                            | PROC5,  |
| <b>CS8</b>                                                | <b>Maintenance and cleaning</b>                                                                   | PROC8a, |
| <b>CS9</b>                                                | <b>Sampling of compounds</b>                                                                      | PROC2,  |
| <b>CS10</b>                                               | <b>Quality control of compounds</b>                                                               | PROC15, |
| <b>CS11</b>                                               | <b>Charging/discharging from/to vessels/large</b>                                                 | PROC8b, |
| <b>CS12</b>                                               | <b>Transfer in a small containers</b>                                                             | PROC9,  |
| <b>CS13</b>                                               | <b>Production of preparations or articles by tableting, compression, extrusion, pelletisation</b> | PROC14  |

**13.2. Conditions of use affecting exposure**

**13.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Industrial formulation end-products ()**

|                                                                          |   |                                                                           |
|--------------------------------------------------------------------------|---|---------------------------------------------------------------------------|
| <b>Amount used, frequency and duration of use (or from service life)</b> |   |                                                                           |
| 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                                                                  |
| <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 |

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|                                                                                        |                                    |
|----------------------------------------------------------------------------------------|------------------------------------|
| STP effluent                                                                           | : 2,000 m3/d                       |
| STP<br>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                      |

**13.2.2. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**13.2.3. 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 |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Technical and organisational conditions and measures</b>                                                                                                                                                                                                                                                   |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                                                                                  |                                           |
| General measures (eye irritants)<br>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 |

**13.2.4. 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 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                 |                                           |
| General measures (eye irritants)<br>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 |

**13.2.5. 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 1 %. |          |
| Physical form of product                              | : Liquid |

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|                                                                                                                                                                                                                                                                                                  |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Use in closed process, no likelihood of exposure<br>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 |

**13.2.6. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced.<br>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 |

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**13.2.7. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**13.2.8. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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.                                                                                                                                                                                    |                                    |

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|                                                    |                                           |
|----------------------------------------------------|-------------------------------------------|
| <b>Other conditions affecting workers exposure</b> |                                           |
| Indoor or outdoor use                              | : Indoor use                              |
| Temperature                                        | : Assumes process temperature up to 40 °C |

**13.2.9. 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 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.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**13.2.10. 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 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Advanced. |                                       |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| <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 |

**13.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Charging/discharging from/to vessels/large ()**

|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**13.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9) / Transfer in a small containers ()**

|                                                                          |                                    |
|--------------------------------------------------------------------------|------------------------------------|
| <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 |

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|                                                                                                                                                                                                                                              |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Technical and organisational conditions and measures</b>                                                                                                                                                                                  |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**13.2.13. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

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

**13.3.1. 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 |

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|                                       |                                      |        |
|---------------------------------------|--------------------------------------|--------|
| 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  |

**13.3.2. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |        |

**13.3.3. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.137 mg/kg bw/day<br>(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.) |        |

**13.3.4. 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><br>(ECETOC TRA worker v3) | < 0.01 |
| dermal         | systemic      | long-term          | 0.034 mg/kg bw/day                                | < 0.01 |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|--------|
|                 |          |           | (ECETOC TRA worker v3)                                                     |        |
| combined routes | systemic | long-term |                                                                            | < 0.01 |
| dermal          | local    | long-term | (Risk management measures are based on qualitative risk characterisation.) |        |

**13.3.5. 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><br>(ECETOC TRA worker v3)                         | < 0.01 |
| dermal          | systemic      | long-term          | 0.0034 mg/kg bw/day<br>(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.) |        |

**13.3.6. 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><br>(ECETOC TRA worker v3)                          | 0.017  |
| dermal          | systemic      | long-term          | 0.069 mg/kg bw/day<br>(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.) |        |

**13.3.7. 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><br>(ECETOC TRA worker v3) | 0.028 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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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|  |  |  |                                        |  |
|--|--|--|----------------------------------------|--|
|  |  |  | on qualitative risk characterisation.) |  |
|--|--|--|----------------------------------------|--|

**13.3.8. 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><br>(ECETOC TRA worker v3)                          | 0.055 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**13.3.9. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.137 mg/kg bw/day<br>(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.) |        |

**13.3.10. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(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.) |        |

**13.3.11. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic | long-term | 1.371 mg/kg bw/day<br>(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.) |        |

**13.3.12. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.686 mg/kg bw/day<br>(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.) |        |

**13.3.13. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.343 mg/kg bw/day<br>(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.) |       |

**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

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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.

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**ES14: Formulation or re-packing, Formulation of fragrance compounds (IFRA GES 1)**

**14.1. 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 |

**14.2. Conditions of use affecting exposure**

**14.2.1. 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<br>Water - minimum efficiency of 0.255 %                                           |                                                                             |
| <b>Conditions and measures related to treatment of waste (including article waste)</b> |                                                                             |

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|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Waste treatment | : Particular considerations on the waste treatment operations |
|-----------------|---------------------------------------------------------------|

**14.2.2. 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).<br>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 |

**14.2.3. 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).<br>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                       |

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|             |                                           |
|-------------|-------------------------------------------|
| Temperature | : Assumes process temperature up to 40 °C |
|-------------|-------------------------------------------|

**14.2.4. 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).<br>Occupational Health and Safety Management System: Advanced. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                  |                                           |
| Use suitable eye protection.<br>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 |

**14.2.5. 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).<br>Occupational Health and Safety Management System: Advanced. |                                    |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                  |                                    |
| Use suitable eye protection.<br>For further specification, refer to section 8 of the SDS.                                                     |                                    |
| <b>Other conditions affecting workers exposure</b>                                                                                            |                                    |

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

**14.2.6. 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).<br>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 |

**14.2.7. 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).<br>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>                                                                                            |                                    |

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

**14.2.8. 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).<br>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 |

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

**14.3.1. 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 |

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**14.3.2. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |        |

**14.3.3. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.0034 mg/kg bw/day<br>(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.) |        |

**14.3.4. 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><br>(ECETOC TRA worker v3)                          | 0.017  |
| dermal          | systemic      | long-term          | 0.069 mg/kg bw/day<br>(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.) |        |

**14.3.5. 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><br>(ECETOC TRA) | 0.028 |

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|-----------------|----------|-----------|-------------------------------------------------------------------------------------|-------|
|                 |          |           | worker v3)                                                                          |       |
| dermal          | systemic | long-term | 1.371 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | 0.137 |
| combined routes | systemic | long-term |                                                                                     | 0.165 |
| dermal          | local    | long-term | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |       |

**14.3.6. 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><br>(ECETOC TRA<br>worker v3)                                | < 0.01 |
| dermal          | systemic      | long-term          | 0.034 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | < 0.01 |
| combined routes | systemic      | long-term          |                                                                                     | < 0.01 |
| dermal          | local         | long-term          | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |        |

**14.3.7. 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><br>(ECETOC TRA<br>worker v3)                                | < 0.01 |
| dermal          | systemic      | long-term          | 0.686 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)                                     | 0.069  |
| combined routes | systemic      | long-term          |                                                                                     | 0.078  |
| dermal          | local         | long-term          | (Risk management<br>measures are based<br>on qualitative risk<br>characterisation.) |        |

**14.3.8. 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><br>(ECETOC TRA<br>worker v3) | 0.055 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(ECETOC TRA<br>worker v3)      | 0.137 |
| combined routes | systemic      | long-term          |                                                      | 0.192 |

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|        |       |           |                                                                            |  |
|--------|-------|-----------|----------------------------------------------------------------------------|--|
| dermal | local | long-term | (Risk management measures are based on qualitative risk characterisation.) |  |
|--------|-------|-----------|----------------------------------------------------------------------------|--|

**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.

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**ES15: Widespread use by professional workers, Professional uses, end-products**

**15.1. Title section**

|                               |                                          |
|-------------------------------|------------------------------------------|
| <b>Structured Short Title</b> | : Widespread use by professional workers |
|-------------------------------|------------------------------------------|

|                    |                                                                                                                                       |         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Environment</b> |                                                                                                                                       |         |
| <b>CS1</b>         | Professional end-use of washing and cleaning products (IFRA GES 4)                                                                    | ERC8d,  |
| <b>Worker</b>      |                                                                                                                                       |         |
| <b>CS2</b>         | The use as fragrance solvent in various products (detergents, laundry products, dishwash products, kitchen cleaners, medical devices) | PROC8a, |
| <b>CS3</b>         | Use of detergent and conditioners                                                                                                     | PROC8a, |
| <b>CS4</b>         | The use as fragrance solvent in various products (general purpose cleaners, laundry products, floor and carpet cleaners)              | PROC8a, |
| <b>CS5</b>         | The use as fragrance solvent in various products (laundry products, dishwash products, kitchen and drain cleaners)                    | PROC8a, |
| <b>CS6</b>         | Prespotter/stain remover                                                                                                              | PROC11, |
| <b>CS7</b>         | Dishwash products (Use phase)                                                                                                         | PROC10, |
| <b>CS8</b>         | Dishwash and rinse products (Preparatory phase)                                                                                       | PROC8b, |
| <b>CS9</b>         | Dishwash and rinse products (Use phase)                                                                                               | PROC2,  |
| <b>CS10</b>        | The use as fragrance solvent in various products                                                                                      | PROC10, |
| <b>CS11</b>        | General purpose cleaner, spray and wipe (Use phase)                                                                                   | PROC11, |
| <b>CS12</b>        | Kitchen cleaners (Use phase)                                                                                                          | PROC10, |
| <b>CS13</b>        | The use as fragrance solvent in various products                                                                                      | PROC11, |
| <b>CS14</b>        | Descaling agent                                                                                                                       | PROC13, |
| <b>CS15</b>        | Oven, grill cleaner                                                                                                                   | PROC10, |
| <b>CS16</b>        | Floor cleaners (Preparatory phase)                                                                                                    | PROC8a, |
| <b>CS17</b>        | Floor cleaners, spray and wipe (Use phase)                                                                                            | PROC11, |
| <b>CS18</b>        | The use as fragrance solvent in various products                                                                                      | PROC8a, |
| <b>CS19</b>        | Car wash and dewaxing products (Use phase)                                                                                            | PROC4,  |
| <b>CS20</b>        | Spray and rinse process (Use phase)                                                                                                   | PROC11, |
| <b>CS21</b>        | Boat cleaners (Use process)                                                                                                           | PROC10, |
| <b>CS22</b>        | Surface cleaner: high and medium pressure (Preparatory phase)                                                                         | PROC8a, |
| <b>CS23</b>        | Surface cleaner: high and medium pressure (Use phase)                                                                                 | PROC11, |
| <b>CS24</b>        | Medical devices (Preparatory process)                                                                                                 | PROC8a, |
| <b>CS25</b>        | Medical devices (Use phase)                                                                                                           | PROC4,  |
| <b>CS26</b>        | Medical devices: dipping process (Preparatory process)                                                                                | PROC8a, |
| <b>CS27</b>        | Medical devices: dipping process (Use phase)                                                                                          | PROC13, |
| <b>CS28</b>        | The use as fragrance solvent in various products                                                                                      | PROC11, |

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**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, outdoor) (ERC8d) / Professional end-use of washing and cleaning products (IFRA GES 4) ()**

|                                                                                        |                                    |
|----------------------------------------------------------------------------------------|------------------------------------|
| <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 sewage treatment plant</b>                       |                                    |
| STP<br>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. |

**15.2.2. 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) ()**

|                                                                                                                                                                                                                                           |                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.                                                                                                                                                                          |                                           |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of $\geq 80$ %<br>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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**15.2.3. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**15.2.4. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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.                                                                                                                                                                                                     |                                    |

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|                                                           |                                           |
|-----------------------------------------------------------|-------------------------------------------|
| 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 |

**15.2.5. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**15.2.6. 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>              |                                    |

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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

**15.2.7. Control of worker exposure: Roller application or brushing (PROC10) / Dishwash products (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)**

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.  
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

**15.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b) / Dishwash and rinse products (Preparatory phase) ()**

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|                                                                                                                                                                                                                                           |                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Product (article) characteristics</b>                                                                                                                                                                                                  |                                           |
| Covers percentage substance in the product up to 1 %.                                                                                                                                                                                     |                                           |
| Physical form of product                                                                                                                                                                                                                  | : Liquid                                  |
| <b>Amount used, 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**15.2.9. 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.<br>Avoid splashing.<br>Closed continuous process with occasional controlled exposure<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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.                                                                                                                                                                                                                                                  |                                       |

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|                                                    |                                           |
|----------------------------------------------------|-------------------------------------------|
| <b>Other conditions affecting workers exposure</b> |                                           |
| Indoor or outdoor use                              | : Indoor use                              |
| Temperature                                        | : Assumes process temperature up to 40 °C |

**15.2.10. Control of worker exposure: Roller application or brushing (PROC10) / 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>                                                                                                                                                                  |                                           |
| 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>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 |

**15.2.11. Control of worker exposure: Non-industrial spraying (PROC11) / General purpose cleaner, 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 15 min/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.<br>Avoid splashing. |                                       |

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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

**15.2.12. 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

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**15.2.13. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**15.2.14. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 $\geq 80$ %                                                                                                                                                                                                |                                    |

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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

**15.2.15. Control of worker exposure: Roller application or brushing (PROC10) / Oven, grill cleaner ( )**

**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 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: 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

**15.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Floor cleaners (Preparatory 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 1 h/day

**Technical and organisational conditions and measures**

Avoid direct eye contact with product, also via contamination on hands.

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|                                                                                                                                                                |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                   |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.                                                                                               |                                           |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of $\geq 80\%$<br>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 |

**15.2.17. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic.<br>Segregation of the source: No segregation |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                                                                           |                                           |
| General measures (eye irritants)<br>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of $\geq 90\%$<br>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 |

**15.2.18. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / The use as fragrance solvent in various products ()**

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|                                                                                                                                                         |                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Product (article) characteristics</b>                                                                                                                |                                           |
| Covers percentage substance in the product up to 1 %.                                                                                                   |                                           |
| Physical form of product                                                                                                                                | : Liquid                                  |
| <b>Amount used, 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.<br>Avoid splashing.<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                            |                                           |
| General measures (eye irritants)<br>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 |

**15.2.19. 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.<br>Avoid splashing.<br>Occupational Health and Safety Management System: Basic. |                                        |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                            |                                        |
| General measures (eye irritants)<br>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>                                                                                                      |                                        |

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

**15.2.20. 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.<br>Avoid splashing.<br>Occupational Health and Safety Management System: Basic.<br>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                                                                                                                     |                                           |

**15.2.21. 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.<br>Avoid splashing. |                                        |

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|                                                                                              |                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------|
| Occupational Health and Safety Management System: Basic.                                     |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b> |                                           |
| General measures (eye irritants)<br>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                                        |                                           |

**15.2.22. 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.<br>Avoid splashing.<br>Occupational Health and Safety Management System: Basic. |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                            |                                           |
| General measures (eye irritants)<br>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 |

**15.2.23. 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 %         |  |

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|                                                                                                                                                         |                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 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.<br>Avoid splashing.<br>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 |

**15.2.24. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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.                                                                                                                                                                                 |                                    |

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|                                                    |                                           |
|----------------------------------------------------|-------------------------------------------|
| <b>Other conditions affecting workers exposure</b> |                                           |
| Indoor or outdoor use                              | : Indoor use                              |
| Temperature                                        | : Assumes process temperature up to 40 °C |

**15.2.25. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) / Medical devices (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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| Local exhaust ventilation<br>Dermal - minimum efficiency of 80 %<br>Inhalation - minimum efficiency of 80 %                                                                                                                               |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.<br>Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of >= 80 %<br>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 |

**15.2.26. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a) / Medical devices: dipping process (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 15 min/day |

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|                                                                                                                                                                                                                                           |                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Technical and organisational conditions and measures</b>                                                                                                                                                                               |                                           |
| Avoid direct eye contact with product, also via contamination on hands.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                           |
| Local exhaust ventilation<br>Dermal - minimum efficiency of 80 %<br>Inhalation - minimum efficiency of 80 %                                                                                                                               |                                           |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                           |
| General measures (eye irritants)<br>Use suitable eye protection.                                                                                                                                                                          |                                           |
| Wear suitable gloves tested to EN374.<br>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 |

**15.2.27. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>Occupational Health and Safety Management System: Basic. |                                    |
| Local exhaust ventilation<br>Dermal - minimum efficiency of 80 %<br>Inhalation - minimum efficiency of 80 %                                                                                                                               |                                    |
| <b>Conditions and measures related to personal protection, hygiene and health evaluation</b>                                                                                                                                              |                                    |
| General measures (eye irritants)<br>Use suitable eye protection.                                                                                                                                                                          |                                    |
| Wear suitable gloves tested to EN374.<br>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                       |

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|             |                                           |
|-------------|-------------------------------------------|
| Temperature | : Assumes process temperature up to 40 °C |
|-------------|-------------------------------------------|

**15.2.28. 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.<br>Avoid splashing.<br>Provide a basic standard of general ventilation (1 to 3 air changes per hour).<br>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 |

**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, 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             | < 0.01 |

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|                                       | v2.1) |        |
| Man via environment - combined routes |       | < 0.01 |

**15.3.2. 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><br>(ECETOC TRA worker v3)                          | 0.023 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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.) |       |

**15.3.3. 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><br>(ECETOC TRA worker v3)                          | 0.229 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**15.3.4. 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><br>(ECETOC TRA worker v3)                          | 0.046 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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.) |       |

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**15.3.5. 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><br>(ECETOC TRA worker v3)                          | 0.023 |
| dermal          | systemic      | long-term          | 1.371 mg/kg bw/day<br>(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.) |       |

**15.3.6. 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<br>(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.) |       |

**15.3.7. 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><br>(ECETOC TRA worker v3)                          | 0.229 |
| dermal          | systemic      | long-term          | 0.549 mg/kg bw/day<br>(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.) |       |

**15.3.8. 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><br>(ECETOC TRA worker v3) | < 0.01 |
| dermal         | systemic      | long-term          | 0.274 mg/kg bw/day<br>(ECETOC TRA worker v3)      | 0.027  |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| combined routes | systemic | long-term |                                                                            | 0.037 |
| dermal          | local    | long-term | (Risk management measures are based on qualitative risk characterisation.) |       |

**15.3.9. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.137 mg/kg bw/day<br>(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.) |        |

**15.3.10. 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><br>(ECETOC TRA worker v3)                          | 0.229 |
| dermal          | systemic      | long-term          | 2.743 mg/kg bw/day<br>(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.) |       |

**15.3.11. 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<br>(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.) |       |

**15.3.12. Worker exposure: Roller application or brushing (PROC10) / Kitchen cleaners (Use phase) ()**

| Exposure route | Health effect | Exposure indicator | Exposure level | RCR |
|----------------|---------------|--------------------|----------------|-----|
|----------------|---------------|--------------------|----------------|-----|

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| 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<br>(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.) |       |

**15.3.13. 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><br>(ECETOC TRA worker v3)                          | 0.092 |
| dermal          | systemic      | long-term          | 2.143 mg/kg bw/day<br>(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.) |       |

**15.3.14. 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><br>(ECETOC TRA worker v3)                          | 0.11  |
| dermal          | systemic      | long-term          | 1.645 mg/kg bw/day<br>(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.) |       |

**15.3.15. 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><br>(ECETOC TRA worker v3)                          | 0.275 |
| dermal          | systemic      | long-term          | 3.292 mg/kg bw/day<br>(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.) |       |

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|--|--|--|--------------------|--|
|  |  |  | characterisation.) |  |
|--|--|--|--------------------|--|

**15.3.16. 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><br>(ECETOC TRA worker v3)                          | 0.275 |
| dermal          | systemic      | long-term          | 1.645 mg/kg bw/day<br>(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.) |       |

**15.3.17. 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<br>(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.) |       |

**15.3.18. 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><br>(ECETOC TRA worker v3)                          | 0.032 |
| dermal          | systemic      | long-term          | 0.274 mg/kg bw/day<br>(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.) |       |

**15.3.19. 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><br>(ECETOC TRA worker v3) | 0.385 |

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|-----------------|----------|-----------|----------------------------------------------------------------------------|-------|
| dermal          | systemic | long-term | 0.823 mg/kg bw/day<br>(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.) |       |

**15.3.20. 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<br>(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.) |       |

**15.3.21. 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<br>(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.) |       |

**15.3.22. 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><br>(ECETOC TRA worker v3)                          | 0.096 |
| dermal          | systemic      | long-term          | 1.645 mg/kg bw/day<br>(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.) |       |

**15.3.23. Worker exposure: Non-industrial spraying (PROC11) / Surface cleaner: high and medium pressure (Use phase) ()**

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| Exposure route  | Health effect | Exposure indicator | Exposure level                                                             | RCR   |
|-----------------|---------------|--------------------|----------------------------------------------------------------------------|-------|
| inhalative      | systemic      | long-term          | 23.12 mg/m <sup>3</sup><br>(ECETOC TRA worker v3)                          | 0.385 |
| dermal          | systemic      | long-term          | 3.275 mg/kg bw/day<br>(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.) |       |

**15.3.24. 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><br>(ECETOC TRA worker v3)                          | < 0.01 |
| dermal          | systemic      | long-term          | 0.055 mg/kg bw/day<br>(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.) |        |

**15.3.25. 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><br>(ECETOC TRA worker v3)                          | 0.011  |
| dermal          | systemic      | long-term          | 0.027 mg/kg bw/day<br>(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.) |        |

**15.3.26. 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><br>(ECETOC TRA worker v3) | < 0.01 |
| dermal         | systemic      | long-term          | 0.055 mg/kg bw/day<br>(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.) |      |

**15.3.27. 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><br>(ECETOC TRA worker v3)                          | 0.011  |
| dermal          | systemic      | long-term          | 0.055 mg/kg bw/day<br>(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.) |        |

**15.3.28. 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><br>(ECETOC TRA worker v3)                          | 0.092 |
| dermal          | systemic      | long-term          | 2.143 mg/kg bw/day<br>(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.) |       |

**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.

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**ES16: Consumer use, End use of cosmetic products**

**16.1. 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,  |

**16.2. Conditions of use affecting exposure**

**16.2.1. 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. |

**16.2.2. 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   |

**16.2.3. Control of consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()**

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|                                                                          |                |
|--------------------------------------------------------------------------|----------------|
| <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   |

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

**16.3.1. 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 |

**16.3.2. Consumer exposure: Cosmetics, personal care products (PC39) / End use of cosmetic products ()**

|                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Additional information on exposure estimation</b>                                                                                                                                                                                                     |
| 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. |

**16.3.3. Consumer exposure: Perfumes, fragrances (PC28) / End use of cosmetic products ()**

|                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Additional information on exposure estimation</b>                                                                                                                                                                                                     |
| 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. |

#### **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.