

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

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

#### 1.1 Product identifier

Trade name : MMB (3-Methoxy-3-Methyl-1-Butanol)  
Product code : KIM-019  
REACH Registration Number : 01-2119976333-33-0000  
Substance name : 3-Methoxy-3-methylbutan-1-ol  
EC-No. : 260-252-4

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

Use of the Sub-  
stance/Mixture : Cleaning agent, Coatings, Raw material

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

Company : Kuraray Co., Ltd.  
Isoprene Chemicals Division,  
Chemicals Marketing and Sales Department  
Importer: Kuraray Europe GmbH  
Philipp-Reis-Straße 4  
65795 Hattersheim am Main, Deutschland  
  
Telephone : +49-69-305-35844  
  
E-mail address of person  
responsible for the SDS : sds.chem@kuraray.com

#### 1.4 Emergency telephone number

+81-3-6701-1639(9:00-18:00 JST)

---

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

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

Eye irritation, Category 2 H319: Causes serious eye irritation.

#### 2.2 Label elements

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

Hazard pictograms :



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version 1.5      Revision Date: 04.10.2016      SDS Number: 110696-00006      Date of last issue: 02.06.2016  
Date of first issue: 04.05.2015

Signal word : Warning

Hazard statements : H319 Causes serious eye irritation.

Precautionary statements : **Prevention:**  
P264 Wash skin thoroughly after handling.  
P280 Wear eye protection/ face protection.

**Response:**  
P337 + P313 If eye irritation persists: Get medical advice/ attention.

### 2.3 Other hazards

Vapours may form explosive mixture with air.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Substance name : 3-Methoxy-3-methylbutan-1-ol

EC-No. : 260-252-4

#### Hazardous components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
3-Methoxy-3-methylbutan-1-ol	56539-66-3 260-252-4	>= 90 - <= 100

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.  
When symptoms persist or in all cases of doubt seek medical advice.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.

If inhaled : If inhaled, remove to fresh air.  
Get medical attention if symptoms occur.

In case of skin contact : Wash with water and soap as a precaution.  
Get medical attention if symptoms occur.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.  
If easy to do, remove contact lens, if worn.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Get medical attention.

If swallowed : If swallowed, DO NOT induce vomiting.  
Get medical attention if symptoms occur.  
Rinse mouth thoroughly with water.

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

Risks : Causes serious eye irritation.

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

Treatment : Treat symptomatically and supportively.

---

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Water spray  
Alcohol-resistant foam  
Carbon dioxide (CO<sub>2</sub>)  
Dry chemical

Unsuitable extinguishing media : High volume water jet

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

Specific hazards during fire-fighting : Do not use a solid water stream as it may scatter and spread fire.  
Flash back possible over considerable distance.  
Vapours may form explosive mixtures with air.  
Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides

### 5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.  
Use water spray to cool unopened containers.  
Remove undamaged containers from fire area if it is safe to do so.  
Evacuate area.

---

## SECTION 6: Accidental release measures

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

Personal precautions : Remove all sources of ignition.

---

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Use personal protective equipment.  
Follow safe handling advice and personal protective equipment recommendations.

### 6.2 Environmental precautions

Environmental precautions : Discharge into the environment must be avoided.  
Prevent further leakage or spillage if safe to do so.  
Prevent spreading over a wide area (e.g. by containment or oil barriers).  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.

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

Methods for cleaning up : Non-sparking tools should be used.  
Soak up with inert absorbent material.  
Suppress (knock down) gases/vapours/mists with a water spray jet.  
For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.  
Clean up remaining materials from spill with suitable absorbent.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

### 6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

---

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use with local exhaust ventilation.

Advice on safe handling : Avoid inhalation of vapour or mist.  
Do not swallow.  
Do not get in eyes.  
Avoid prolonged or repeated contact with skin.  
Handle in accordance with good industrial hygiene and safety practice.  
Keep container tightly closed.  
Keep away from heat and sources of ignition.  
Take precautionary measures against static discharges.  
Take care to prevent spills, waste and minimize release to the

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version 1.5      Revision Date: 04.10.2016      SDS Number: 110696-00006      Date of last issue: 02.06.2016  
Date of first issue: 04.05.2015

environment.

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

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

Requirements for storage areas and containers : Keep in properly labelled containers. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations. Keep away from heat and sources of ignition.

Advice on common storage : Do not store with the following product types:  
Strong oxidizing agents  
Explosives  
Gases

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

Contains no substances with occupational exposure limit values.

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

Substance name	End Use	Exposure routes	Potential health effects	Value
3-Methoxy-3-methylbutan-1-ol	Workers	Inhalation	Long-term systemic effects	5.9 mg/m <sup>3</sup>
	Workers	Skin contact	Long-term systemic effects	2 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	1.7 mg/m <sup>3</sup>
	Consumers	Skin contact	Long-term systemic effects	1.2 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	0.5 mg/kg bw/day

### 8.2 Exposure controls

#### Engineering measures

Ensure adequate ventilation, especially in confined areas.  
Minimize workplace exposure concentrations.

#### Personal protective equipment

Eye protection : Wear the following personal protective equipment:  
Safety goggles

Hand protection

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Material	:	butyl-rubber
Break through time	:	> 480 min
Glove thickness	:	0.7 mm
Directive	:	DIN EN 374

Remarks	:	Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.
---------	---	---

Skin and body protection	:	Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Wear the following personal protective equipment: Flame retardant antistatic protective clothing. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
--------------------------	---	---

Respiratory protection	:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
------------------------	---	---

Filter type	:	Organic vapour type (A)
-------------	---	-------------------------

---

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance	:	liquid
Colour	:	colourless
Odour	:	slight, ether-like
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	< -50 °C
Initial boiling point and boiling range	:	173 °C
Flash point	:	71 °C Other information: No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Upper explosion limit	:	13.1 %(V)
Lower explosion limit	:	1.2 %(V)
Vapour pressure	:	0.47 hPa (20 °C)
Relative vapour density	:	4.1
Density	:	0.91 g/cm <sup>3</sup> (20 °C)
Solubility(ies)		
Water solubility	:	completely miscible
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	395 °C
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	12.5 mPa.s (20 °C)
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

### 9.2 Other information

Particle size	:	Not applicable
---------------	---	----------------

---

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Not classified as a reactivity hazard.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions	:	Combustible liquid. Vapours may form explosive mixture with air. Can react with strong oxidizing agents.
---------------------	---	--

### 10.4 Conditions to avoid

Conditions to avoid	:	Heat, flames and sparks.
---------------------	---	--------------------------

### 10.5 Incompatible materials

Materials to avoid	:	Oxidizing agents
--------------------	---	------------------

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

### 10.6 Hazardous decomposition products

No hazardous decomposition products are known.

---

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation  
Skin contact  
Ingestion  
Eye contact

#### Acute toxicity

Not classified based on available information.

#### Components:

##### 3-Methoxy-3-methylbutan-1-ol:

Acute oral toxicity : LD50 (Rat): 4,400 mg/kg

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

#### Skin corrosion/irritation

Not classified based on available information.

#### Components:

##### 3-Methoxy-3-methylbutan-1-ol:

Species: Rabbit  
Result: No skin irritation

#### Serious eye damage/eye irritation

Causes serious eye irritation.

#### Components:

##### 3-Methoxy-3-methylbutan-1-ol:

Species: Rabbit  
Result: Irritation to eyes, reversing within 21 days

#### Respiratory or skin sensitisation

##### Skin sensitisation

Not classified based on available information.

##### Respiratory sensitisation

Not classified based on available information.

#### Components:

##### 3-Methoxy-3-methylbutan-1-ol:



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Test Type: Maximisation Test  
Exposure routes: Skin contact  
Species: Guinea pig  
Result: negative

### Germ cell mutagenicity

Not classified based on available information.

### Components:

#### 3-Methoxy-3-methylbutan-1-ol:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 476  
Result: negative

: Test Type: Bacterial reverse mutation assay (AMES)  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative

: Test Type: Chromosome aberration test in vitro  
Metabolic activation: with and without metabolic activation  
Result: negative

### Carcinogenicity

Not classified based on available information.

### Reproductive toxicity

Not classified based on available information.

### Components:

#### 3-Methoxy-3-methylbutan-1-ol:

Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 421  
Result: negative

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

### STOT - single exposure

Not classified based on available information.

### STOT - repeated exposure

Not classified based on available information.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version 1.5      Revision Date: 04.10.2016      SDS Number: 110696-00006      Date of last issue: 02.06.2016  
Date of first issue: 04.05.2015

---

### Repeated dose toxicity

#### Components:

##### **3-Methoxy-3-methylbutan-1-ol:**

Species: Rat, male  
NOAEL: 60 mg/kg  
LOAEL: 250 mg/kg  
Application Route: Ingestion  
Exposure time: 28 Days

Species: Rat, male  
LOAEL: 0.53 mg/l  
Application Route: inhalation (vapour)  
Exposure time: 28 Days

#### **Aspiration toxicity**

Not classified based on available information.

---

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

##### **3-Methoxy-3-methylbutan-1-ol:**

Toxicity to fish : LC50 (Oryzias latipes (Japanese medaka)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1,000 mg/l  
Exposure time: 48 h

Toxicity to algae : NOEC (Selenastrum capricornutum (green algae)): 1,000 mg/l  
Exposure time: 72 h

ErC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l  
Exposure time: 72 h

Toxicity to microorganisms : EC50 : > 1,000 mg/l  
Exposure time: 3 h

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 100 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
Method: OECD Test Guideline 211

### 12.2 Persistence and degradability

#### Components:

##### **3-Methoxy-3-methylbutan-1-ol:**

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

Biodegradability : Result: Biodegradable.  
Biodegradation: 78.9 %  
Exposure time: 28 d  
Method: OECD Test Guideline 310

Result: Inherently biodegradable.  
Biodegradation: 100 %  
Exposure time: 28 d  
Method: OECD Test Guideline 302C

### 12.3 Bioaccumulative potential

#### Components:

##### **3-Methoxy-3-methylbutan-1-ol:**

Partition coefficient: n- : log Pow: 0.18  
octanol/water

### 12.4 Mobility in soil

No data available

### 12.5 Results of PBT and vPvB assessment

Not relevant

### 12.6 Other adverse effects

No data available

---

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.  
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.  
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
Empty containers retain residue and can be dangerous.  
Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death.  
If not otherwise specified: Dispose of as unused product.

---

## SECTION 14: Transport information

### 14.1 UN number

Not regulated as a dangerous good

### 14.2 UN proper shipping name

Not regulated as a dangerous good

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

### 14.3 Transport hazard class(es)

Not regulated as a dangerous good

### 14.4 Packing group

Not regulated as a dangerous good

### 14.5 Environmental hazards

Not regulated as a dangerous good

### 14.6 Special precautions for user

Not applicable

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

Remarks : Not applicable for product as supplied.

---

## SECTION 15: Regulatory information

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

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59) : Not applicable

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

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

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable

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

Other regulations : Exposure Scenario is available as separate attachment.

### 15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

---

## SECTION 16: Other information

### Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Cana-

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## MMB (3-Methoxy-3-Methyl-1-Butanol)

Version	Revision Date:	SDS Number:	Date of last issue: 02.06.2016
1.5	04.10.2016	110696-00006	Date of first issue: 04.05.2015

---

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

### Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

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. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

GB / EN

# Annex to the Safety Data Sheet (SDS) of 3-Methoxy-3-methylbutanol (MMB)

## Table of Contents

1. ES 1: Formulation; Distribution and (Re)packaging of substance as such .....	6
1.1. Title section .....	6
1.2. Conditions of use affecting exposure.....	6
1.2.1. Control of environmental exposure: Distribution and (Re)packaging of substance as such (ERC 2) .....	6
1.2.2. Control of worker exposure: Closed continuous system (PROC 1).....	6
1.2.3. Control of worker exposure: Closed process with sample taking (PROC 2).....	7
1.2.4. Control of worker exposure: Closed batch process (PROC 3).....	7
1.2.5. Control of worker exposure: Partly open batch process (PROC 4) .....	8
1.2.6. Control of worker exposure: External Transfer Processes (PROC 8a).....	8
1.2.7. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	8
1.2.8. Control of worker exposure: Filling of small containers (PROC 9) .....	9
1.2.9. Control of worker exposure: Laboratory Use (PROC 15) .....	9
1.3. Exposure estimation and reference to its source .....	10
1.3.1. Environmental release and exposure: Distribution and (Re)packaging of substance as such (ERC 2) .....	10
1.3.2. Worker exposure: Closed continuous system (PROC 1) .....	10
1.3.3. Worker exposure: Closed process with sample taking (PROC 2).....	10
1.3.4. Worker exposure: Closed batch process (PROC 3) .....	10
1.3.5. Worker exposure: Partly open batch process (PROC 4).....	10
1.3.6. Worker exposure: External Transfer Processes (PROC 8a).....	11
1.3.7. Worker exposure: Internal Transfer Processes (PROC 8b) .....	11
1.3.8. Worker exposure: Filling of small containers (PROC 9).....	11
1.3.9. Worker exposure: Laboratory Use (PROC 15).....	11
1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	11
2. ES 2: Formulation; Formulation, compounding and packing of preparations .....	12
2.1. Title section .....	12
2.2. Conditions of use affecting exposure.....	12
2.2.1. Control of environmental exposure: Formulation, compounding and packing of preparations (ERC 2).....	12
2.2.2. Control of worker exposure: Closed continuous system (PROC 1).....	12
2.2.3. Control of worker exposure: Closed process with sample taking (PROC 2).....	13
2.2.4. Control of worker exposure: Closed batch process (PROC 3).....	13
2.2.5. Control of worker exposure: Partly open batch process (PROC 4) .....	14
2.2.6. Control of worker exposure: Blending in open batch process (PROC 5) .....	14
2.2.7. Control of worker exposure: External Transfer Processes (PROC 8a).....	14
2.2.8. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	15
2.2.9. Control of worker exposure: Filling of small containers (PROC 9) .....	15
2.2.10. Control of worker exposure: Formulation of pellets (PROC 14).....	16
2.2.11. Control of worker exposure: Laboratory Use (PROC 15) .....	16
2.3. Exposure estimation and reference to its source .....	17
2.3.1. Environmental release and exposure: Formulation, compounding and packing of preparations (ERC 2).....	17
2.3.2. Worker exposure: Closed continuous system (PROC 1) .....	17
2.3.3. Worker exposure: Closed process with sample taking (PROC 2).....	17
2.3.4. Worker exposure: Closed batch process (PROC 3) .....	17
2.3.5. Worker exposure: Partly open batch process (PROC 4).....	17
2.3.6. Worker exposure: Blending in open batch process (PROC 5).....	18
2.3.7. Worker exposure: External Transfer Processes (PROC 8a).....	18

2.3.8. Worker exposure: Internal Transfer Processes (PROC 8b) .....	18
2.3.9. Worker exposure: Filling of small containers (PROC 9).....	18
2.3.10. Worker exposure: Formulation of pellets (PROC 14) .....	18
2.3.11. Worker exposure: Laboratory Use (PROC 15).....	18
2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	19
3. ES 3: Use at industrial site; Industrial cleaning - water and solvent based; Cleaners and degreasing agents; PC 35; SU 0 .....	20
3.1. Title section .....	20
3.2. Conditions of use affecting exposure.....	20
3.2.1. Control of environmental exposure: use in washing and cleaning products water and solvent based (ERC 4).....	20
3.2.2. Control of worker exposure: Closed process with sample taking (PROC 2).....	20
3.2.3. Control of worker exposure: Partly open batch process (PROC 4) .....	21
3.2.4. Control of worker exposure: Blending in open batch process (PROC 5) .....	21
3.2.5. Control of worker exposure: Industrial spaying (PROC 7).....	22
3.2.6. Control of worker exposure: External Transfer Processes (PROC 8a).....	22
3.2.7. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	22
3.2.8. Control of worker exposure: Roller Application or Brushing (PROC 10).....	23
3.2.9. Control of worker exposure: Article treatment by dipping (PROC 13).....	23
3.3. Exposure estimation and reference to its source.....	24
3.3.1. Environmental release and exposure: use in washing and cleaning products water and solvent based (ERC 4).....	24
3.3.2. Worker exposure: Closed process with sample taking (PROC 2).....	24
3.3.3. Worker exposure: Partly open batch process (PROC 4).....	24
3.3.4. Worker exposure: Blending in open batch process (PROC 5).....	24
3.3.5. Worker exposure: Industrial spaying (PROC 7) .....	25
3.3.6. Worker exposure: External Transfer Processes (PROC 8a).....	25
3.3.7. Worker exposure: Internal Transfer Processes (PROC 8b) .....	25
3.3.8. Worker exposure: Roller Application or Brushing (PROC 10) .....	25
3.3.9. Worker exposure: Article treatment by dipping (PROC 13).....	25
3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	25
4. ES 4: Use by professional worker; professional cleaning agents indoors and outdoors; Cleaners and degreasing agents; PC 35; SU 0.....	26
4.1. Title section .....	26
4.2. Conditions of use affecting exposure.....	26
4.2.1. Control of environmental exposure: cleaning agents outdoor and indoor use (ERC 8d).....	26
4.2.2. Control of worker exposure: Partly open batch process (PROC 4) .....	26
4.2.3. Control of worker exposure: External Transfer Processes (PROC 8a).....	27
4.2.4. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	27
4.2.5. Control of worker exposure: Roller Application or Brushing (PROC 10).....	28
4.2.6. Control of worker exposure: Spraying indoors (PROC 11).....	28
4.2.7. Control of worker exposure: Professional spraying outdoors (PROC 11).....	29
4.2.8. Control of worker exposure: Article treatment by dipping (PROC 13).....	30
4.3. Exposure estimation and reference to its source.....	30
4.3.1. Environmental release and exposure: cleaning agents outdoor and indoor use (ERC 8d).....	30
4.3.2. Worker exposure: Partly open batch process (PROC 4).....	30
4.3.3. Worker exposure: External Transfer Processes (PROC 8a).....	31
4.3.4. Worker exposure: Internal Transfer Processes (PROC 8b) .....	31
4.3.5. Worker exposure: Roller Application or Brushing (PROC 10) .....	31
4.3.6. Worker exposure: Spraying indoors (PROC 11) .....	31
4.3.7. Worker exposure: Professional spraying outdoors (PROC 11) .....	31
4.3.8. Worker exposure: Article treatment by dipping (PROC 13).....	31
4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	32
5. ES 5: Consumer Use; Washing and Cleaning Agents for Consumers; Cleaners and degreasing agents .....	33
5.1. Title section .....	33
5.2. Conditions of use affecting exposure.....	33
5.2.1. Control of environmental exposure: Washing and Cleaning (ERC 8a).....	33
5.2.2. Control of consumer exposure: Liquid degreasers <50% (PC 24).....	33
5.2.3. Control of consumer exposure: 1. Laundry and dishwashing (PC 35) .....	35
5.2.4. Control of consumer exposure: 2. Household floor cleaning and polishing (PC 35).....	35

5.2.5. Control of consumer exposure: 3. Sprays for cleaning (PC 35).....	35
5.3. Exposure estimation and reference to its source.....	35
5.3.1. Environmental release and exposure: Washing and Cleaning (ERC 8a).....	37
5.3.2. Consumer exposure: Liquid degreasers <50% (PC 24).....	37
5.3.3. Consumer exposure: 1. Laundry and dishwashing (PC 35).....	37
5.3.4. Consumer exposure: 2. Household floor cleaning and polishing (PC 35).....	37
5.3.5. Consumer exposure: 3. Sprays for cleaning (PC 35).....	37
5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	38
6. ES 6: Use at industrial site; Industrial coatings use as solvent; Coatings solvent / water based including ink jet; PC 9a; SU 0.....	39
6.1. Title section.....	39
6.2. Conditions of use affecting exposure.....	39
6.2.1. Control of environmental exposure: Solvent use in coatings (ERC 4).....	39
6.2.2. Control of worker exposure: Closed process with sample taking (PROC 2).....	39
6.2.3. Control of worker exposure: Closed batch process (PROC 3).....	40
6.2.4. Control of worker exposure: Partly open batch process (PROC 4).....	40
6.2.5. Control of worker exposure: Blending in open batch process (PROC 5).....	41
6.2.6. Control of worker exposure: Industrial spaying (PROC 7).....	41
6.2.7. Control of worker exposure: External Transfer Processes (PROC 8a).....	42
6.2.8. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	42
6.2.9. Control of worker exposure: Filling of small containers (PROC 9).....	42
6.2.10. Control of worker exposure: Roller Application or Brushing (PROC 10).....	43
6.2.11. Control of worker exposure: Article treatment by dipping (PROC 13).....	43
6.3. Exposure estimation and reference to its source.....	44
6.3.1. Environmental release and exposure: Solvent use in coatings (ERC 4).....	44
6.3.2. Worker exposure: Closed process with sample taking (PROC 2).....	44
6.3.3. Worker exposure: Closed batch process (PROC 3).....	44
6.3.4. Worker exposure: Partly open batch process (PROC 4).....	44
6.3.5. Worker exposure: Blending in open batch process (PROC 5).....	44
6.3.6. Worker exposure: Industrial spaying (PROC 7).....	45
6.3.7. Worker exposure: External Transfer Processes (PROC 8a).....	45
6.3.8. Worker exposure: Internal Transfer Processes (PROC 8b).....	45
6.3.9. Worker exposure: Filling of small containers (PROC 9).....	45
6.3.10. Worker exposure: Roller Application or Brushing (PROC 10).....	45
6.3.11. Worker exposure: Article treatment by dipping (PROC 13).....	45
6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	46
7. ES 7: Use by professional worker; Professional use of coatings (solvent / water based / ink); Coatings solvent / water based including ink jet; PC 9a; SU 0.....	47
7.1. Title section.....	47
7.2. Conditions of use affecting exposure.....	47
7.2.1. Control of environmental exposure: Coatings outdoor and indoor (ERC 8d).....	47
7.2.2. Control of worker exposure: Partly open batch process (PROC 4).....	47
7.2.3. Control of worker exposure: Blending in open batch process (PROC 5).....	48
7.2.4. Control of worker exposure: External Transfer Processes (PROC 8a).....	48
7.2.5. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	49
7.2.6. Control of worker exposure: Roller Application or Brushing (PROC 10).....	49
7.2.7. Control of worker exposure: Spraying (PROC 11).....	50
7.2.8. Control of worker exposure: Professional spraying outdoors (PROC 11).....	50
7.2.9. Control of worker exposure: Article treatment by dipping (PROC 13).....	50
7.2.10. Control of worker exposure: Laboratory Use (PROC 15).....	52
7.3. Exposure estimation and reference to its source.....	52
7.3.1. Environmental release and exposure: Coatings outdoor and indoor (ERC 8d).....	52
7.3.2. Worker exposure: Partly open batch process (PROC 4).....	52
7.3.3. Worker exposure: Blending in open batch process (PROC 5).....	52
7.3.4. Worker exposure: External Transfer Processes (PROC 8a).....	53
7.3.5. Worker exposure: Internal Transfer Processes (PROC 8b).....	53
7.3.6. Worker exposure: Roller Application or Brushing (PROC 10).....	53
7.3.7. Worker exposure: Spraying (PROC 11).....	53
7.3.8. Worker exposure: Professional spraying outdoors (PROC 11).....	53
7.3.9. Worker exposure: Article treatment by dipping (PROC 13).....	53



7.3.10. Worker exposure: Laboratory Use (PROC 15).....	54
7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	54
8. ES 8: Consumer Use; Consumer uses of adhesives, coatings and ink jet ink ; Coatings solvent / water based including ink jet.....	55
8.1. Title section .....	55
8.2. Conditions of use affecting exposure.....	55
8.2.1. Control of environmental exposure: Use as solvent (ERC 8a).....	55
8.2.2. Control of consumer exposure: 2. Solvent rich wall paint (PC 9a).....	55
8.2.3. Control of consumer exposure: 3. Aerosol paint spray (PC 9a).....	55
8.2.4. Control of consumer exposure: Adhesives (PC 1).....	57
8.2.5. Control of consumer exposure: Ink for ink jet printer and ball point pens (PC 18).....	58
8.3. Exposure estimation and reference to its source.....	59
8.3.1. Environmental release and exposure: Use as solvent (ERC 8a).....	60
8.3.2. Consumer exposure: 2. Solvent rich wall paint (PC 9a).....	61
8.3.3. Consumer exposure: 3. Aerosol paint spray (PC 9a).....	61
8.3.4. Consumer exposure: Adhesives (PC 1).....	61
8.3.5. Consumer exposure: Ink for ink jet printer and ball point pens (PC 18).....	61
8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	61
9. ES 9: Use by professional worker; Air Care applications by Professionals; Air Care Products; PC 3; SU 0.....	62
9.1. Title section .....	62
9.2. Conditions of use affecting exposure.....	62
9.2.1. Control of environmental exposure: Wide dispersive indoor use (ERC 8a).....	62
9.2.2. Control of worker exposure: Blending in open batch process (PROC 5).....	62
9.2.3. Control of worker exposure: Brushing application (PROC 10).....	63
9.2.4. Control of worker exposure: Spraying (PROC 11).....	63
9.2.5. Control of worker exposure: Article treatment by dipping (PROC 13).....	64
9.3. Exposure estimation and reference to its source.....	64
9.3.1. Environmental release and exposure: Wide dispersive indoor use (ERC 8a).....	64
9.3.2. Worker exposure: Blending in open batch process (PROC 5).....	64
9.3.3. Worker exposure: Brushing application (PROC 10).....	64
9.3.4. Worker exposure: Spraying (PROC 11).....	65
9.3.5. Worker exposure: Article treatment by dipping (PROC 13).....	65
9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	65
10. ES 10: Consumer Use; Indoor air refreshing for general public; Air Care Products.....	66
10.1. Title section .....	66
10.2. Conditions of use affecting exposure.....	66
10.2.1. Control of environmental exposure: Air refreshers indoor use (ERC 8a).....	66
10.2.2. Control of consumer exposure: 1. Air refreshener aerosol/spray use (PC 3).....	66
10.2.3. Control of consumer exposure: 2.,3.,4. Air refreshener diffusor applications (PC 3).....	66
10.3. Exposure estimation and reference to its source.....	67
10.3.1. Environmental release and exposure: Air refreshers indoor use (ERC 8a).....	67
10.3.2. Consumer exposure: 1. Air refreshener aerosol/spray use (PC 3).....	67
10.3.3. Consumer exposure: 2.,3.,4. Air refreshener diffusor applications (PC 3).....	67
10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES.....	67
11. ES 11: Use by professional worker; Use in Additives and Coalescents; Functional Fluids and Additives; PC 34; SU 0.....	68
11.1. Title section .....	68
11.2. Conditions of use affecting exposure.....	68
11.2.1. Control of environmental exposure: Coatings indoor (ERC 8a).....	68
11.2.2. Control of worker exposure: Partly open batch process (PROC 4).....	68
11.2.3. Control of worker exposure: Blending in open batch process (PROC 5).....	69
11.2.4. Control of worker exposure: External Transfer Processes (PROC 8a).....	69
11.2.5. Control of worker exposure: Internal Transfer Processes (PROC 8b).....	70
11.2.6. Control of worker exposure: Roller Application or Brushing (PROC 10).....	70
11.2.7. Control of worker exposure: Spraying (PROC 11).....	70
11.2.8. Control of worker exposure: Article treatment by dipping (PROC 13).....	71
11.2.9. Control of worker exposure: Laboratory Use (PROC 15).....	71
11.3. Exposure estimation and reference to its source.....	72
11.3.1. Environmental release and exposure: Coatings indoor (ERC 8a).....	72

11.3.2. Worker exposure: Partly open batch process (PROC 4).....	72
11.3.3. Worker exposure: Blending in open batch process (PROC 5).....	72
11.3.4. Worker exposure: External Transfer Processes (PROC 8a).....	72
11.3.5. Worker exposure: Internal Transfer Processes (PROC 8b) .....	72
11.3.6. Worker exposure: Roller Application or Brushing (PROC 10) .....	73
11.3.7. Worker exposure: Spraying (PROC 11) .....	73
11.3.8. Worker exposure: Article treatment by dipping (PROC 13).....	73
11.3.9. Worker exposure: Laboratory Use (PROC 15).....	73
11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	73
12. ES 12: Consumer Use; Plant protection uses, aerosols indoor/outdoor; Functional Fluids and Additives .	74
12.1. Title section .....	74
12.2. Conditions of use affecting exposure.....	74
12.2.1. Control of environmental exposure: Insecticides (ERC 8d) .....	74
12.2.2. Control of consumer exposure: Insecticide for spraying plants indoor use (PC 8).....	74
12.3. Exposure estimation and reference to its source .....	74
12.3.1. Environmental release and exposure: Insecticides (ERC 8d) .....	75
12.3.2. Consumer exposure: Insecticide for spraying plants indoor use (PC 8) .....	76
12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES .....	76
13. ES 13: Consumer Use; Cosmetics; Cosmetic, personal care and perfume additives.....	77
13.1. Title section .....	77
13.2. Conditions of use affecting exposure.....	77
13.2.1. Control of environmental exposure: Cosmetics (ERC 8d).....	77
13.3. Exposure estimation and reference to its source .....	77
13.3.1. Environmental release and exposure: Cosmetics (ERC 8d).....	77

# 1. ES 1: Formulation; Distribution and (Re)packaging of substance as such

## 1.1. Title section

<b>Environment</b>	
CS 1: Distribution and (Re)packaging of substance as such	ERC 2
<b>Worker</b>	
CS 2: Closed continuous system	PROC 1
CS 3: Closed process with sample taking	PROC 2
CS 4: Closed batch process	PROC 3
CS 5: Partly open batch process	PROC 4
CS 6: External Transfer Processes	PROC 8a
CS 7: Internal Transfer Processes	PROC 8b
CS 8: Filling of small containers	PROC 9
CS 9: Laboratory Use	PROC 15

## 1.2. Conditions of use affecting exposure

### 1.2.1. Control of environmental exposure: Distribution and (Re)packaging of substance as such (ERC 2)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily use at site: &lt;= 5 tonnes/day</i>
<i>Annual use at a site: &lt;= 500 tonnes/year</i>
<i>Percentage of tonnage used at regional scale: = 100 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: &gt;= 2E3 m3/d</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: &gt;= 1.8E4 m3/d</i>

### 1.2.2. Control of worker exposure: Closed continuous system (PROC 1)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed process, no likelihood of exposure</i>
<i>Advanced (industrial) exposure controls assumed.</i>

<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

### 1.2.3. Control of worker exposure: Closed process with sample taking (PROC 2)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed, continuous process with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 1.2.4. Control of worker exposure: Closed batch process (PROC 3)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed batch process (synthesis or formulation) with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

**1.2.5. Control of worker exposure: Partly open batch process (PROC 4)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

**1.2.6. Control of worker exposure: External Transfer Processes (PROC 8a)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**1.2.7. Control of worker exposure: Internal Transfer Processes (PROC 8b)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>

<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 1.2.8. Control of worker exposure: Filling of small containers (PROC 9)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 1.2.9. Control of worker exposure: Laboratory Use (PROC 15)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

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

#### 1.3.1. Environmental release and exposure: Distribution and (Re)packaging of substance as such (ERC 2)

Release route	Release rate	Release estimation method
Water	100 kg/day	ERC based
Air	125 kg/day	ERC based
Soil	0.5 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	0.01 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	0.023 mg/kg bw/day	0.047
Man via Environment – combined routes		0.052

#### 1.3.2. Worker exposure: Closed continuous system (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.049 mg/m <sup>3</sup> (TRA Worker v3)	< 0.01
Dermal, systemic, long-term	0.034 mg/kg bw/day (TRA Worker v3)	0.017
Eye, local		Qualitative
Combined routes, systemic, long-term		0.025

#### 1.3.3. Worker exposure: Closed process with sample taking (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.492 mg/m <sup>3</sup> (TRA Worker v3)	0.083
Dermal, systemic, long-term	1.37 mg/kg bw/day (TRA Worker v3)	0.685
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

#### 1.3.4. Worker exposure: Closed batch process (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	0.69 mg/kg bw/day (TRA Worker v3)	0.345
Eye, local		Qualitative
Combined routes, systemic, long-term		0.595

#### 1.3.5. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

**1.3.6. Worker exposure: External Transfer Processes (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.985 mg/m <sup>3</sup> (TRA Worker v3)	0.167
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.852

**1.3.7. Worker exposure: Internal Transfer Processes (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.739 mg/m <sup>3</sup> (TRA Worker v3)	0.125
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.468

**1.3.8. Worker exposure: Filling of small containers (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

**1.3.9. Worker exposure: Laboratory Use (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.432 mg/m <sup>3</sup> (TRA Worker v3)	0.751
Dermal, systemic, long-term	0.34 mg/kg bw/day (TRA Worker v3)	0.17
Eye, local		Qualitative
Combined routes, systemic, long-term		0.921

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).



## 2. ES 2: Formulation; Formulation, compounding and packing of preparations

### 2.1. Title section

<b>Environment</b>	
CS 1: Formulation, compounding and packing of preparations	ERC 2
<b>Worker</b>	
CS 2: Closed continuous system	PROC 1
CS 3: Closed process with sample taking	PROC 2
CS 4: Closed batch process	PROC 3
CS 5: Partly open batch process	PROC 4
CS 6: Blending in open batch process	PROC 5
CS 7: External Transfer Processes	PROC 8a
CS 8: Internal Transfer Processes	PROC 8b
CS 9: Filling of small containers	PROC 9
CS 10: Formulation of pellets	PROC 14
CS 11: Laboratory Use	PROC 15

### 2.2. Conditions of use affecting exposure

#### 2.2.1. Control of environmental exposure: Formulation, compounding and packing of preparations (ERC 2)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily use at site: &lt;= 5 tonnes/day</i>
<i>Annual use at a site: &lt;= 500 tonnes/year</i>
<i>Percentage of tonnage used at regional scale: = 100 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: &gt;= 2E3 m3/d</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: &gt;= 1.8E4 m3/d</i>

#### 2.2.2. Control of worker exposure: Closed continuous system (PROC 1)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>

<i>Use in closed process, no likelihood of exposure</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

### 2.2.3. Control of worker exposure: Closed process with sample taking (PROC 2)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed, continuous process with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 2.2.4. Control of worker exposure: Closed batch process (PROC 3)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed batch process (synthesis or formulation) with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>

*Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)*

### 2.2.5. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 2.2.6. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 2.2.7. Control of worker exposure: External Transfer Processes (PROC 8a)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>

<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 2.2.8. Control of worker exposure: Internal Transfer Processes (PROC 8b)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 2.2.9. Control of worker exposure: Filling of small containers (PROC 9)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>

<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

**2.2.10. Control of worker exposure: Formulation of pellets (PROC 14)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

**2.2.11. Control of worker exposure: Laboratory Use (PROC 15)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

## 2.3. Exposure estimation and reference to its source

### 2.3.1. Environmental release and exposure: Formulation, compounding and packing of preparations (ERC 2)

Release route	Release rate	Release estimation method
Water	100 kg/day	ERC based
Air	125 kg/day	ERC based
Soil	0.5 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	0.01 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	0.023 mg/kg bw/day	0.047
Man via environment - combined routes		0.052

### 2.3.2. Worker exposure: Closed continuous system (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.049 mg/m <sup>3</sup> (TRA Worker v3)	< 0.01
Dermal, systemic, long-term	0.034 mg/kg bw/day (TRA Worker v3)	0.017
Eye, local		Qualitative
Combined routes, systemic, long-term		0.025

### 2.3.3. Worker exposure: Closed process with sample taking (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.492 mg/m <sup>3</sup> (TRA Worker v3)	0.083
Dermal, systemic, long-term	1.37 mg/kg bw/day (TRA Worker v3)	0.685
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

### 2.3.4. Worker exposure: Closed batch process (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	0.69 mg/kg bw/day (TRA Worker v3)	0.345
Eye, local		Qualitative
Combined routes, systemic, long-term		0.595

### 2.3.5. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

**2.3.6. Worker exposure: Blending in open batch process (PROC 5)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.137
Eye, local		Qualitative
Combined routes, systemic, long-term		0.554

**2.3.7. Worker exposure: External Transfer Processes (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.985 mg/m <sup>3</sup> (TRA Worker v3)	0.167
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.852

**2.3.8. Worker exposure: Internal Transfer Processes (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.739 mg/m <sup>3</sup> (TRA Worker v3)	0.125
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.468

**2.3.9. Worker exposure: Filling of small containers (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

**2.3.10. Worker exposure: Formulation of pellets (PROC 14)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.343 mg/kg bw/day (TRA Worker v3)	0.172
Eye, local		Qualitative
Combined routes, systemic, long-term		0.589

**2.3.11. Worker exposure: Laboratory Use (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.432 mg/m <sup>3</sup> (TRA Worker v3)	0.751
Dermal, systemic, long-term	0.34 mg/kg bw/day (TRA Worker v3)	0.17
Eye, local		Qualitative
Combined routes, systemic, long-term		0.921

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).



### 3. ES 3: Use at industrial site; Industrial cleaning - water and solvent based; Cleaners and degreasing agents; PC 35; SU 0

#### 3.1. Title section

Washing and Cleaning Products (including solvent based products) (PC 35)	
Other (SU 0)	
<b>Environment</b>	
CS 1: use in washing and cleaning products water and solvent based	ERC 4
<b>Worker</b>	
CS 2: Closed process with sample taking	PROC 2
CS 3: Partly open batch process	PROC 4
CS 4: Blending in open batch process	PROC 5
CS 5: Industrial spaying	PROC 7
CS 6: External Transfer Processes	PROC 8a
CS 7: Internal Transfer Processes	PROC 8b
CS 8: Roller Application or Brushing	PROC 10
CS 9: Article treatment by dipping	PROC 13

#### 3.2. Conditions of use affecting exposure

##### 3.2.1. Control of environmental exposure: use in washing and cleaning products water and solvent based (ERC 4)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily use at site: &lt;= 1 tonnes/day</i>
<i>Annual use at a site: &lt;= 100 tonnes/year</i>
<i>Percentage of tonnage used at regional scale: = 100 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: &gt;= 2E3 m3/d</i>
<i>No application of sludge to soil</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: &gt;= 1.8E4 m3/d</i>

##### 3.2.2. Control of worker exposure: Closed process with sample taking (PROC 2)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>

<i>Use in closed, continuous process with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 3.2.3. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 3.2.4. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>

<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

**3.2.5. Control of worker exposure: Industrial spaying (PROC 7)**

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

**3.2.6. Control of worker exposure: External Transfer Processes (PROC 8a)**

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**3.2.7. Control of worker exposure: Internal Transfer Processes (PROC 8b)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>

<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 3.2.8. Control of worker exposure: Roller Application or Brushing (PROC 10)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 3.2.9. Control of worker exposure: Article treatment by dipping (PROC 13)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>

*For further specification for exposure controls/personal protection, refer to section 8 of the SDS.*

**Other conditions affecting workers exposure**

*Indoor use*

*Assumes elevated process temperature up to 40 °C*

*Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)*

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

#### 3.3.1. Environmental release and exposure: use in washing and cleaning products water and solvent based (ERC 4)

Release route	Release rate	Release estimation method
Water	1E3 kg/day	ERC based
Air	1E3 kg/day	ERC based
Soil	50 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	0.076 mg/m <sup>3</sup>	0.045
Man via Environment - Oral	0.213 mg/kg bw/day	0.425
Man via environment - combined routes		0.47

#### 3.3.2. Worker exposure: Closed process with sample taking (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.492 mg/m <sup>3</sup> (TRA Worker v3)	0.083
Dermal, systemic, long-term	1.37 mg/kg bw/day (TRA Worker v3)	0.685
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

#### 3.3.3. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

#### 3.3.4. Worker exposure: Blending in open batch process (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.137
Eye, local		Qualitative
Combined routes, systemic, long-term		0.554

**3.3.5. Worker exposure: Industrial spaying (PROC 7)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.924 mg/m <sup>3</sup> (TRA Worker v3)	0.835
Dermal, systemic, long-term	0.214 mg/kg bw/day (TRA Worker v3)	0.107
Eye, local		Qualitative
Combined routes, systemic, long-term		0.942

**3.3.6. Worker exposure: External Transfer Processes (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.985 mg/m <sup>3</sup> (TRA Worker v3)	0.167
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.852

**3.3.7. Worker exposure: Internal Transfer Processes (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.739 mg/m <sup>3</sup> (TRA Worker v3)	0.125
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.468

**3.3.8. Worker exposure: Roller Application or Brushing (PROC 10)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.689 mg/m <sup>3</sup> (TRA Worker v3)	0.117
Dermal, systemic, long-term	1.372 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.803

**3.3.9. Worker exposure: Article treatment by dipping (PROC 13)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.954 mg/m <sup>3</sup> (TRA Worker v3)	0.501
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.844

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

## 4. ES 4: Use by professional worker; professional cleaning agents indoors and outdoors; Cleaners and degreasing agents; PC 35; SU 0

### 4.1. Title section

Washing and Cleaning Products (including solvent based products) (PC 35)	
Other (SU 0)	
<b>Environment</b>	
CS 1: cleaning agents outdoor and indoor use	ERC 8d, ERC 8a
<b>Worker</b>	
CS 2: Partly open batch process	PROC 4
CS 3: External Transfer Processes	PROC 8a
CS 4: Internal Transfer Processes	PROC 8b
CS 5: Roller Application or Brushing	PROC 10
CS 6: Spraying indoors	PROC 11
CS 7: Professional spraying outdoors	PROC 11
CS 8: Article treatment by dipping	PROC 13

### 4.2. Conditions of use affecting exposure

#### 4.2.1. Control of environmental exposure: cleaning agents outdoor and indoor use (ERC 8d)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily wide dispersive use: <math>\leq 5.5E-5</math> tonnes/day</i>
<i>Percentage of tonnage used at regional scale: = 10 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: <math>\geq 2E3</math> m<sup>3</sup>/d</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: <math>\geq 1.8E4</math> m<sup>3</sup>/d</i>

#### 4.2.2. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: <math>&gt;25\%</math></i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>

<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

#### 4.2.3. Control of worker exposure: External Transfer Processes (PROC 8a)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

#### 4.2.4. Control of worker exposure: Internal Transfer Processes (PROC 8b)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>



<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

#### 4.2.5. Control of worker exposure: Roller Application or Brushing (PROC 10)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

#### 4.2.6. Control of worker exposure: Spraying indoors (PROC 11)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 5 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

**4.2.7. Control of worker exposure: Professional spraying outdoors (PROC 11)**

<b>Product (article) characteristics and substance emission potential</b>
<i>Covers percentage substance in the product up to 10 %.</i>
<i>Substance product type: Liquids</i>
<i>Assuming a density of 1g/cm<sup>3</sup></i>
<i>Vapour pressure: 47 Pa</i>
<i>Liquid mole fraction: 0.1</i>
<i>Activity coefficient: 2</i>
<b>Amount used (or contained in articles), frequency, duration of use/exposure and details for activity</b>
<i>Cumulative duration of spraying: 60 min</i>
<i>Near field exposure</i>
<b>Activity emission potential</b>
<i>Surface spraying of liquids</i>
<i>Moderate application rate (0.3 - 3 l/minute)</i>
<i>Only horizontal or downward spray direction</i>
<i>Spraying with high compressed air use</i>
<i>Is spraying done overhead level or downwards? level</i>
<i>Worker not segregated</i>
<i>&lt; 1m far away from source</i>
<i>Direction of Airflow not clearly away from worker</i>
<i>Application Rate 1l/min</i>
<b>Surface contamination</b>
<i>Process not fully enclosed</i>
<i>Effective housekeeping practices in place</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Dispersion and other conditions affecting workers exposure</b>
<i>Outdoors use</i>
<i>Source not located close to buildings</i>
<i>Process temperature: Room temperature</i>
<i>Exposure amount (dermal to hands): 5.8 ml</i>
<i>Body weight 70kg</i>

**Remarks on exposure data (Method: Riskofderm 2.0)**

- Dermal, systemic, long-term:  
Report date: August 2012  
Percentile used for the exposure rate distribution 90%;

**Remarks on exposure data (Method: ART 1.5)**

- Inhalation, systemic, long-term:  
Report date: February 2013;

Mechanistic model results:

The predicted 90th percentile full-shift exposure is 13 mg/m<sup>3</sup>.

The inter-quartile confidence interval is 5.9 mg/m<sup>3</sup> to 32 mg/m<sup>3</sup>.

A protection factor using respirators (FFP2 to protect from aerosols) of 10 is assumed to further reduce the exposure value.

#### 4.2.8. Control of worker exposure: Article treatment by dipping (PROC 13)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

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

#### 4.3.1. Environmental release and exposure: cleaning agents outdoor and indoor use (ERC 8d)

Release route	Release rate	Release estimation method
Water	0.055 kg/day	ERC based
Air	0.055 kg/day	ERC based
Soil	0.011 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.319E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.347E-4 mg/kg bw/day	< 0.01
Man via environment - combined routes		< 0.01

#### 4.3.2. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.954 mg/m <sup>3</sup> (TRA Worker v3)	0.501
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343

Route of exposure and type of effects	Exposure estimate	RCR
Eye, local		Qualitative
Combined routes, systemic, long-term		0.844

#### 4.3.3. Worker exposure: External Transfer Processes (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	0.823 mg/kg bw/day (TRA Worker v3)	0.411
Eye, local		Qualitative
Combined routes, systemic, long-term		0.662

#### 4.3.4. Worker exposure: Internal Transfer Processes (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

#### 4.3.5. Worker exposure: Roller Application or Brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.034 mg/m <sup>3</sup> (TRA Worker v3)	0.175
Dermal, systemic, long-term	1.646 mg/kg bw/day (TRA Worker v3)	0.823
Eye, local		Qualitative
Combined routes, systemic, long-term		0.998

#### 4.3.6. Worker exposure: Spraying indoors (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.757 mg/m <sup>3</sup> (TRA Worker v3)	0.467
Dermal, systemic, long-term	0.429 mg/kg bw/day (TRA Worker v3)	0.214
Eye, local		Qualitative
Combined routes, systemic, long-term		0.682

#### 4.3.7. Worker exposure: Professional spraying outdoors (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.3 mg/m <sup>3</sup> (External Tool: <i>ART 1.5</i> )	0.22
Dermal, systemic, long-term	0.83 mg/kg bw/day (External Tool: <i>Riskofderm 2.0</i> )	0.415
Eye, local		Qualitative
Combined routes, systemic, long-term		0.635

#### 4.3.8. Worker exposure: Article treatment by dipping (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.97 mg/m <sup>3</sup> (TRA Worker v3)	0.334

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.137
Eye, local		Qualitative
Combined routes, systemic, long-term		0.471

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in Riskofderm 2.0 at <http://www.eurofins.com/product-testing-services/services/research-development/projects-on-skin-exposure-and-protection/riskofderm-skin-exposure-and-risk-assessment/download-of-riskofderm-toolkit.aspx>) and in ART 1.5 at <https://www.advancedreachtool.com/>)

## 5. ES 5: Consumer Use; Washing and Cleaning Agents for Consumers; Cleaners and degreasing agents

### 5.1. Title section

Washing and Cleaning Products (including solvent based products) (PC 35)	
<b>Environment</b>	
CS 1: Washing and Cleaning	ERC 8a
<b>Consumer</b>	
CS 2: Liquid degreasers <50%	PC 24
CS 3: 1. Laundry and dishwashing	PC 35
CS 4: 2. Household floor cleaning and polishing	PC 35
CS 5: 3. Sprays for cleaning	PC 35

### 5.2. Conditions of use affecting exposure

#### 5.2.1. Control of environmental exposure: Washing and Cleaning (ERC 8a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 2.75E-5$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 5.2.2. Control of consumer exposure: Liquid degreasers <50% (PC 24)

Use of small amounts of highly concentrated substance for degreasing operations

#### Populations

body weight 75 kilogram

#### Products

weight fraction compound 50 %

#### Aggregate Exposures

Total chronic potential dose (mg/kg/day): 0.46;  
Total chronic systemic dose (mg/kg/day): 0.46;

Inhalation chronic potential dose (mg/kg/day)  $0.27 = 0.52$  mg/m<sup>3</sup>  
Inhalation chronic systemic dose (mg/kg/day): 0.27;

Dermal chronic potential dose (mg/kg/day): 0.091;  
Dermal chronic systemic dose (mg/kg/day): 0.091;

Oral chronic potential dose (mg/kg/day): 0.091;  
Oral chronic systemic dose (mg/kg/day): 0.091;

Inhalation model: Exposure to vapour : evaporation

weight fraction compound	0.5	fraction
exposure duration	60	minute
room volume	15	m <sup>3</sup>
ventilation rate	2.5	l/hr
applied amount	10	gram
release area	1.7E4	cm <sup>2</sup>
application duration	10	minute
mol weight matrix	22	g/mol
mass transfer rate	3.4E3	m/min

Uptake model: Fraction

uptake fraction	1	fraction
inhalation rate	24	liter/min

Dermal model: Direct dermal contact with product : instant application

weight fraction compound	0.5	fraction
exposed area	2.2E2	cm <sup>2</sup>
applied amount	0.1	gram

Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

Oral model: Oral exposure to product : direct intake

weight fraction compound	50	%
amount ingested	0.1	gram

Uptake model: Fraction

uptake fraction	1	fraction
-----------------	---	----------

Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: July 2012;  
  
vapour pressure 70 Pascal;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report
- Oral, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

### 5.2.3. Control of consumer exposure: 1. Laundry and dishwashing (PC 35)

Covers up to 10% concentration of the substance under A.I.S.E REACT standard parameters.

#### Remarks on exposure data (Method: AISE REACT)

- Dermal, systemic, long-term:  
A.I.S.E default parameters for liquid regular dishwashing agents,  
"AISE modelling" report date: August 2012
- Oral, systemic, long-term:  
oral exposure calculated, 10% concentration

Concentrations above 10% of the substance shall be labeled as irritant.

### 5.2.4. Control of consumer exposure: 2. Household floor cleaning and polishing (PC 35)

Dermal exposure up to 30% concentration; covers also PC 31 applications.

#### Remarks on exposure data (Method: AISE REACT)

- Dermal, systemic, long-term:  
"AISE modelling" report date: August 2012

#### Surface Cleaners, waxes and Polishing agents (AISE P7, C35) scenario:

liquid cleaner use with 30% (w/w) of substance;  
assumed to be diluted to 2.2% in wash solution = 0.6% of substance concentration.  
daily use and direct skin contact with washing solution  
no estimation of oral and inhalation exposure.  
Inhalation is not considered relevant in low concentration aqueous solutions as used in this model.

Concentrations above 10% of the substance shall be labeled as irritant.

### 5.2.5. Control of consumer exposure: 3. Sprays for cleaning (PC 35)

Covers up to 20% (w/w) of the substance in household spray applications

#### Populations

body weight	65	kilogram
-------------	----	----------

#### Products

weight fraction compound	20	%
--------------------------	----	---

#### Aggregate Exposures

Total chronic potential dose (mg/kg/day): 0.64  
Total chronic systemic dose (mg/kg/day): 0.64

Inhalation chronic potential dose (mg/kg/day): 0.18  
Inhalation chronic systemic dose (mg/kg/day): 0.18

Dermal chronic potential dose (mg/kg/day): 0.42



## 3-Methoxy-3-methylbutanol: Annex to the Safety Data Sheet

---

Dermal chronic systemic dose (mg/kg/day): 0.42

Oral chronic potential dose (mg/kg/day): 0.042

Oral chronic systemic dose (mg/kg/day): 0.042

### Inhalation model: Exposure to vapour : instantaneous release

weight fraction compound	20	%
exposure duration	30	minute
room volume	15	m <sup>3</sup>
ventilation rate	0.5	l/hr
applied amount	10	gram

### Uptake model: Fraction

uptake fraction	1	fraction
inhalation rate	24	liter/min

### Dermal model: Direct dermal contact with product : instant application

weight fraction compound	20	%
exposed area	8.6E2	cm <sup>2</sup>
applied amount	1	gram

### Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

### Oral model: Oral exposure to product : direct intake

weight fraction compound	20	%
amount ingested	0.1	gram

### Uptake model: Fraction

uptake fraction	1	fraction
-----------------	---	----------

### Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: January 2013;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report
- Oral, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

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

#### 5.3.1. Environmental release and exposure: Washing and Cleaning (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.027 kg/day	ERC based
Air	0.027 kg/day	ERC based
Soil	0 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.195E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

#### 5.3.2. Consumer exposure: Liquid degreasers <50% (PC 24)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.52 mg/m <sup>3</sup> (External Tool: <i>ConsExpo 5.0</i> )	0.306
Dermal, systemic, long-term	0.091 mg/kg bw/day (External Tool: <i>ConsExpo 5.0</i> )	0.076
Oral, systemic, long-term	0.091 mg/kg bw/day (External Tool: <i>ConsExpo 5.0</i> )	0.182
Eye, local		Qualitative
Combined routes, systemic, long-term		0.564

#### 5.3.3. Consumer exposure: 1. Laundry and dishwashing (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long-term	0.1 mg/kg bw/day (External Tool: <i>AISE REACT</i> )	0.083
Oral, systemic, long-term	5E-4 mg/kg bw/day (External Tool: <i>AISE REACT</i> )	< 0.01
Eye, local		Qualitative
Combined routes, systemic, long-term		0.084

#### 5.3.4. Consumer exposure: 2. Household floor cleaning and polishing (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long-term	0.94 mg/kg bw/day (External Tool: <i>AISE REACT</i> )	0.783
Eye, local		Qualitative
Combined routes, systemic, long-term		0.783

#### 5.3.5. Consumer exposure: 3. Sprays for cleaning (PC 35)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.18 mg/m <sup>3</sup> (External Tool: <i>Consexpo 5.0</i> )	0.106
Dermal, systemic, long-term	0.42 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.35
Oral, systemic, long-term	0.042 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.084
Eye, local		Qualitative
Combined routes, systemic, long-term		0.54

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

Analogue adaptations may be possible among the determinants driving consumer exposure (see exposure modifying factors in ConsExpo at <http://www.rivm.nl/en/Topics/C/ConsExpo>)

Analogue adaptations may be possible among the determinants driving consumer exposure (see exposure modifying factors in AISE REACT at [http://www.aise.eu/reach/?page=exposureass\\_sub3](http://www.aise.eu/reach/?page=exposureass_sub3))

## 6. ES 6: Use at industrial site; Industrial coatings use as solvent; Coatings solvent / water based including ink jet; PC 9a; SU 0

### 6.1. Title section

Coatings and Paints, Thinners, paint removers (PC 9a)	
Other (SU 0)	
<b>Environment</b>	
CS 1: Solvent use in coatings	ERC 4
<b>Worker</b>	
CS 2: Closed process with sample taking	PROC 2
CS 3: Closed batch process	PROC 3
CS 4: Partly open batch process	PROC 4
CS 5: Blending in open batch process	PROC 5
CS 6: Industrial spaying	PROC 7
CS 7: External Transfer Processes	PROC 8a
CS 8: Internal Transfer Processes	PROC 8b
CS 9: Filling of small containers	PROC 9
CS 10: Roller Application or Brushing	PROC 10
CS 11: Article treatment by dipping	PROC 13

### 6.2. Conditions of use affecting exposure

#### 6.2.1. Control of environmental exposure: Solvent use in coatings (ERC 4)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily use at site: &lt;= 2.5 tonnes/day</i>
<i>Annual use at a site: &lt;= 50 tonnes/year</i>
<i>Percentage of tonnage used at regional scale: = 100 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: &gt;= 2E3 m3/d</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: &gt;= 1.8E4 m3/d</i>

#### 6.2.2. Control of worker exposure: Closed process with sample taking (PROC 2)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>

<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed, continuous process with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 6.2.3. Control of worker exposure: Closed batch process (PROC 3)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in closed batch process (synthesis or formulation) with occasional controlled exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

### 6.2.4. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>

<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 6.2.5. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 6.2.6. Control of worker exposure: Industrial spaying (PROC 7)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

**6.2.7. Control of worker exposure: External Transfer Processes (PROC 8a)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**6.2.8. Control of worker exposure: Internal Transfer Processes (PROC 8b)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Local exhaust ventilation - efficiency of at least 95%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**6.2.9. Control of worker exposure: Filling of small containers (PROC 9)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Covers daily exposures up to 8 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>

<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 6.2.10. Control of worker exposure: Roller Application or Brushing (PROC 10)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 90%</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 6.2.11. Control of worker exposure: Article treatment by dipping (PROC 13)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Advanced (industrial) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>



Assumes elevated process temperature up to 40 °C

Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)

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

#### 6.3.1. Environmental release and exposure: Solvent use in coatings (ERC 4)

Release route	Release rate	Release estimation method
Water	2.5E3 kg/day	ERC based
Air	2.5E3 kg/day	ERC based
Soil	125 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	0.038 mg/m <sup>3</sup>	0.022
Man via Environment - Oral	0.119 mg/kg bw/day	0.238
Man via Environment – combined routes		0.26

#### 6.3.2. Worker exposure: Closed process with sample taking (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.492 mg/m <sup>3</sup> (TRA Worker v3)	0.083
Dermal, systemic, long-term	1.37 mg/kg bw/day (TRA Worker v3)	0.685
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

#### 6.3.3. Worker exposure: Closed batch process (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	0.69 mg/kg bw/day (TRA Worker v3)	0.345
Eye, local		Qualitative
Combined routes, systemic, long-term		0.595

#### 6.3.4. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

#### 6.3.5. Worker exposure: Blending in open batch process (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.137
Eye, local		Qualitative

Route of exposure and type of effects	Exposure estimate	RCR
Combined routes, systemic, long-term		0.554

**6.3.6. Worker exposure: Industrial spaying (PROC 7)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.924 mg/m <sup>3</sup> (TRA Worker v3)	0.835
Dermal, systemic, long-term	0.214 mg/kg bw/day (TRA Worker v3)	0.107
Eye, local		Qualitative
Combined routes, systemic, long-term		0.942

**6.3.7. Worker exposure: External Transfer Processes (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.985 mg/m <sup>3</sup> (TRA Worker v3)	0.167
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.852

**6.3.8. Worker exposure: Internal Transfer Processes (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.739 mg/m <sup>3</sup> (TRA Worker v3)	0.125
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.468

**6.3.9. Worker exposure: Filling of small containers (PROC 9)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.76

**6.3.10. Worker exposure: Roller Application or Brushing (PROC 10)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.689 mg/m <sup>3</sup> (TRA Worker v3)	0.117
Dermal, systemic, long-term	1.372 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.803

**6.3.11. Worker exposure: Article treatment by dipping (PROC 13)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.954 mg/m <sup>3</sup> (TRA Worker v3)	0.501
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343

Route of exposure and type of effects	Exposure estimate	RCR
Eye, local		Qualitative
Combined routes, systemic, long-term		0.844

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

## 7. ES 7: Use by professional worker; Professional use of coatings (solvent / water based / ink); Coatings solvent / water based including ink jet; PC 9a; SU 0

### 7.1. Title section

Coatings and Paints, Thinners, paint removers (PC 9a)	
Other (SU 0)	
<b>Environment</b>	
CS 1: Coatings outdoor and indoor	ERC 8d, ERC 8a
<b>Worker</b>	
CS 2: Partly open batch process	PROC 4
CS 3: Blending in open batch process	PROC 5
CS 4: External Transfer Processes	PROC 8a
CS 5: Internal Transfer Processes	PROC 8b
CS 6: Roller Application or Brushing	PROC 10
CS 7: Spraying	PROC 11
CS 8: Professional spraying outdoors	PROC 11
CS 9: Article treatment by dipping	PROC 13
CS 10: Laboratory Use	PROC 15

### 7.2. Conditions of use affecting exposure

#### 7.2.1. Control of environmental exposure: Coatings outdoor and indoor (ERC 8d)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 2.75E-5$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to sewage treatment plant</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 7.2.2. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
Concentration of substance in mixture: >25%
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Avoid carrying out activities involving exposure for more than 1 hour.
<b>Technical and organisational conditions and measures</b>
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).

<i>Use in semi-closed process with opportunity for exposure</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 7.2.3. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 7.2.4. Control of worker exposure: External Transfer Processes (PROC 8a)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>

<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 7.2.5. Control of worker exposure: Internal Transfer Processes (PROC 8b)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 7.2.6. Control of worker exposure: Roller Application or Brushing (PROC 10)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**7.2.7. Control of worker exposure: Spraying (PROC 11)**

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

**7.2.8. Control of worker exposure: Professional spraying outdoors (PROC 11)**

<b>Product (article) characteristics and substance emission potential</b>
<i>Covers percentage substance in the product up to 10 %.</i>
<i>Substance product type: Liquids</i>
<i>Assuming a density of 1g/cm<sup>3</sup></i>
<i>Vapour pressure: 47 Pa</i>
<i>Liquid mole fraction: 0.1</i>
<i>Activity coefficient: 2</i>
<b>Amount used (or contained in articles), frequency, duration of use/exposure and details for activity</b>
<i>Cumulative duration of spraying: 60 min</i>
<i>Near field exposure</i>
<b>Activity emission potential</b>
<i>Surface spraying of liquids</i>
<i>Moderate application rate (0.3 - 3 l/minute)</i>
<i>Only horizontal or downward spray direction</i>
<i>Spraying with high compressed air use</i>
<i>Is spraying done overhead level or downwards? level</i>
<i>Worker not segregated</i>
<i>&lt; 1m far away from source</i>
<i>Direction of Airflow not clearly away from worker</i>
<i>Application Rate 1l/min</i>
<b>Surface contamination</b>
<i>Process not fully enclosed</i>
<i>Effective housekeeping practices in place</i>

<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Dispersion and other conditions affecting workers exposure</b>
<i>outdoors use</i>
<i>Source not located close to buildings</i>
<i>Process temperature: Room temperature</i>
<i>Exposure amount (dermal to hands): 5.8 ml</i>
<i>Body weight 70kg</i>

**Remarks on exposure data** (Method: RISKOFDERM 2.0)

- Dermal, systemic, long-term:  
Percentile used for the exposure rate distribution 90%

**Remarks on exposure data** (Method: ART 1.5)

- Inhalation, systemic, long-term:  
Report date: February 2013;

Mechanistic model results:

The predicted 90th percentile full-shift exposure is 13 mg/m<sup>3</sup>. The inter-quartile confidence interval is 5.9 mg/m<sup>3</sup> to 32 mg/m<sup>3</sup>. A protection factor using respirators (FFP2 to protect from aerosols) of 10 is assumed to further reduce the exposure value.

**7.2.9. Control of worker exposure: Article treatment by dipping (PROC 13)**

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>



**7.2.10. Control of worker exposure: Laboratory Use (PROC 15)**

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

**7.3. Exposure estimation and reference to its source****7.3.1. Environmental release and exposure: Coatings outdoor and indoor (ERC 8d)**

Release route	Release rate	Release estimation method
<b>Water</b>	0.027 kg/day	ERC based
<b>Air</b>	0.027 kg/day	ERC based
<b>Soil</b>	0.006 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.195E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

**7.3.2. Worker exposure: Partly open batch process (PROC 4)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.954 mg/m <sup>3</sup> (TRA Worker v3)	0.501
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.844

**7.3.3. Worker exposure: Blending in open batch process (PROC 5)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.773 mg/m <sup>3</sup> (TRA Worker v3)	0.3
Dermal, systemic, long-term	0.823 mg/kg bw/day (TRA Worker v3)	0.411
Eye, local		Qualitative
Combined routes, systemic, long-term		0.712

**7.3.4. Worker exposure: External Transfer Processes (PROC 8a)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.462 mg/m <sup>3</sup> (TRA Worker v3)	0.417
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.137
Eye, local		Qualitative
Combined routes, systemic, long-term		0.554

**7.3.5. Worker exposure: Internal Transfer Processes (PROC 8b)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

**7.3.6. Worker exposure: Roller Application or Brushing (PROC 10)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.034 mg/m <sup>3</sup> (TRA Worker v3)	0.175
Dermal, systemic, long-term	1.646 mg/kg bw/day (TRA Worker v3)	0.823
Eye, local		Qualitative
Combined routes, systemic, long-term		0.998

**7.3.7. Worker exposure: Spraying (PROC 11)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.591 mg/m <sup>3</sup> (TRA Worker v3)	0.1
Dermal, systemic, long-term	1.286 mg/kg bw/day (TRA Worker v3)	0.643
Eye, local		Qualitative
Combined routes, systemic, long-term		0.743

**7.3.8. Worker exposure: Professional spraying outdoors (PROC 11)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.3 mg/m <sup>3</sup> (External Tool: <i>ART 1.5</i> )	0.22
Dermal, systemic, long-term	0.83 mg/kg bw/day (External Tool: <i>Riskofderm 2.0</i> )	0.415
Eye, local		Qualitative
Combined routes, systemic, long-term		0.635

**7.3.9. Worker exposure: Article treatment by dipping (PROC 13)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.773 mg/m <sup>3</sup> (TRA Worker v3)	0.3
Dermal, systemic, long-term	0.823 mg/kg bw/day (TRA Worker v3)	0.411
Eye, local		Qualitative
Combined routes, systemic, long-term		0.712

**7.3.10. Worker exposure: Laboratory Use (PROC 15)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.432 mg/m <sup>3</sup> (TRA Worker v3)	0.751
Dermal, systemic, long-term	0.34 mg/kg bw/day (TRA Worker v3)	0.17
Eye, local		Qualitative
Combined routes, systemic, long-term		0.921

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in Riskofderm 2.0 at <http://www.eurofins.com/product-testing-services/services/research-development/projects-on-skin-exposure-and-protection/riskofderm-skin-exposure-and-risk-assessment/download-of-riskofderm-toolkit.aspx>) and in ART 1.5 at <https://www.advancedreachtool.com/>)

## 8. ES 8: Consumer Use; Consumer uses of adhesives, coatings and ink jet ink ; Coatings solvent / water based including ink jet

### 8.1. Title section

Coatings and Paints, Thinners, paint removers (PC 9a)	
<b>Environment</b>	
CS 1: Use as solvent	ERC 8a
<b>Consumer</b>	
CS 2: 2. Solvent rich wall paint	PC 9a
CS 3: 3. Aerosol paint spray	PC 9a
CS 4: Adhesives	PC 1
CS 5: Ink for ink jet printer and ball point pens	PC 18

### 8.2. Conditions of use affecting exposure

#### 8.2.1. Control of environmental exposure: Use as solvent (ERC 8a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 2.75E-5$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 8.2.2. Control of consumer exposure: 2. Solvent rich wall paint (PC 9a)

##### Populations

body weight 75 kilogram

##### Products

weight fraction compound 0,3 fraction  
application frequency 3 per year

##### Aggregate Exposures

Total chronic potential dose (mg/kg/day): 0.61  
Total chronic systemic dose (mg/kg/day): 0.49

## 3-Methoxy-3-methylbutanol: Annex to the Safety Data Sheet

Inhalation chronic potential dose (mg/kg/day): 0.37  
Inhalation chronic systemic dose (mg/kg/day): 0.37

Dermal chronic potential dose (mg/kg/day): 0.12  
Dermal chronic systemic dose (mg/kg/day): 0.12

Oral chronic potential dose (mg/kg/day): 0.12  
Oral chronic systemic dose (mg/kg/day): --

### Inhalation model: Exposure to vapour : evaporation

weight fraction compound	0.3	fraction
exposure duration	1.3E2	minute
room volume	20	m <sup>3</sup>
ventilation rate	0.6	1/hr
applied amount	1E3	gram
release area	1E5	cm <sup>2</sup>
application duration	1.2E2	minute
mol weight matrix	3E2	g/mol
mass transfer rate	3.4E3	m/min

### Uptake model: Fraction

uptake fraction	1	fraction
inhalation rate	38	m <sup>3</sup> /day

### Dermal model: Direct dermal contact with product : constant rate

weight fraction compound	0.3	fraction
exposed area	4.8E2	cm <sup>2</sup>
contact rate	30	mg/min
release duration	7.2E3	second

### Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

### Oral model: Oral exposure to product : direct intake

weight fraction compound	0.3	fraction
amount ingested	1	gram

### Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: July 2012;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report
- Oral, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

**8.2.3. Control of consumer exposure: 3. Aerosol paint spray (PC 9a)****Populations**

body weight	65	kilogram
-------------	----	----------

**Products**

weight fraction compound	30	%
--------------------------	----	---

**Aggregate Exposures**

Total chronic potential dose (mg/kg/day): 0.45

Total chronic systemic dose (mg/kg/day): 0.45

Inhalation chronic potential dose (mg/kg/day): 0.33

Inhalation chronic systemic dose (mg/kg/day): 0.33 (\*65kg/34m3/day) = 0.63 mg/m3

Dermal chronic potential dose (mg/kg/day): 0.11

Dermal chronic systemic dose (mg/kg/day): 0.11

Oral chronic potential dose (mg/kg/day): 0.0038

Oral chronic systemic dose (mg/kg/day): 0.0038

**Inhalation model: Exposure to vapour : instantaneous release**

weight fraction compound	20	%
exposure duration	1.2E2	minute
room volume	35	m3
ventilation rate	1.5	1/hr
applied amount	5E2	gram

**Uptake model: Fraction**

uptake fraction	1	fraction
inhalation rate	24	liter/min

**Dermal model: Direct dermal contact with product : instant application**

weight fraction compound	30	%
exposed area	8.6E2	cm2
applied amount	3	gram

**Uptake model: fraction**

uptake fraction	1	fraction
-----------------	---	----------

**Oral model: Oral exposure to product : direct intake**

weight fraction compound	30	%
amount ingested	0.1	gram

**Uptake model: fraction**

uptake fraction	1	fraction
-----------------	---	----------

**Remarks on exposure data (Method: ConsExpo 5.0)**

- Inhalation, systemic, long-term:  
Report date: July 2012;
- Dermal, systemic, long-term:  
see ConsExpo 5.0 report
- Oral, systemic, long-term:  
see ConsExpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

**8.2.4. Control of consumer exposure: Adhesives (PC 1)**

**Populations**

body weight	75	kilogram
-------------	----	----------

**Products**

weight fraction compound	0,3	fraction
application frequency	3	per year

**Aggregate Exposures**

Total chronic potential dose (mg/kg/day): 0.61

Total chronic systemic dose (mg/kg/day): 0.49

Inhalation chronic potential dose (mg/kg/day): 0.37

Inhalation chronic systemic dose (mg/kg/day): 0.37 = adapted with 75 kg bw and 38 m3/day inhalation rate = 0.73 mg/m3

Dermal chronic potential dose (mg/kg/day): 0.12

Dermal chronic systemic dose (mg/kg/day): 0.12

Oral chronic potential dose (mg/kg/day): 0.12

Oral chronic systemic dose (mg/kg/day): --

**Inhalation model: Exposure to vapour : evaporation**

weight fraction compound	0.3	fraction
exposure duration	1.3E2	minute
room volume	20	m3
ventilation rate	0.6	l/hr
applied amount	1E3	gram
release area	1E5	cm2
application duration	1.2E2	minute
mol weight matrix	3E2	g/mol
mass transfer rate	3.4E3	m/min

**Uptake model: Fraction**

uptake fraction	1	fraction
inhalation rate	38	m3/day

Dermal model: Direct dermal contact with product : constant rate

weight fraction compound	0.3	fraction
exposed area	4.8E2	cm2
contact rate	30	mg/min
release duration	7.2E3	second

Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

Oral model: Oral exposure to product : direct intake

weight fraction compound	0.3	fraction
amount ingested	1	gram

Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: July 2012;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report
- Oral, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

**8.2.5. Control of consumer exposure: Ink for ink jet printer and ball point pens (PC 18)**

Populations

body weight	65	kilogram
-------------	----	----------

Products

weight fraction compound	50	%
--------------------------	----	---

Aggregate Exposures

Total chronic potential dose (mg/kg/day): 0.11

Total chronic systemic dose (mg/kg/day): 0.11

Inhalation chronic potential dose (mg/kg/day): 0.034

Inhalation chronic systemic dose (mg/kg/day): 0.034 (\*65kg / 24 m<sup>3</sup>/day = 0.092 mg/m<sup>3</sup>)

Dermal chronic potential dose (mg/kg/day): 0.038

Dermal chronic systemic dose (mg/kg/day): 0.038

Oral chronic potential dose (mg/kg/day): 0.038

Oral chronic systemic dose (mg/kg/day): 0.038



Inhalation model: Exposure to vapour : instantaneous release

weight fraction compound	50	%
exposure duration	60	minute
room volume	20	m <sup>3</sup>
ventilation rate	0.5	1/hr
applied amount	0.1	gram
release duration	30	minute

Uptake model: Fraction

uptake fraction	1	fraction
inhalation rate	24	liter/min

Dermal model: Direct dermal contact with product : instant application

weight fraction compound	50	%
exposed area	8.6E2	cm <sup>2</sup>
applied amount	0.005	gram

Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

Oral model: Oral exposure to product : direct intake

weight fraction compound	50	%
amount ingested	0.005	gram

Uptake model: Fraction

uptake fraction	1	fraction
-----------------	---	----------

Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: February 2013;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

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

#### 8.3.1. Environmental release and exposure: Use as solvent (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.027 kg/day	ERC based
Air	0.027 kg/day	ERC based
Soil	0 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Oral	1.195E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

### 8.3.2. Consumer exposure: 2. Solvent rich wall paint (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.73 mg/m <sup>3</sup> (External Tool: <i>Consexpo 5.0</i> )	0.429
Dermal, systemic, long-term	0.12 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.1
Oral, systemic, long-term	0.12 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.24
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

### 8.3.3. Consumer exposure: 3. Aerosol paint spray (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.63 mg/m <sup>3</sup> (External Tool: <i>Consexpo 5.0</i> )	0.371
Dermal, systemic, long-term	0.11 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.092
Oral, systemic, long-term	0.004 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	< 0.01
Eye, local		Qualitative
Combined routes, systemic, long-term		0.47

### 8.3.4. Consumer exposure: Adhesives (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.73 mg/m <sup>3</sup> (External Tool: <i>Consexpo 5.0</i> )	0.429
Dermal, systemic, long-term	0.12 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.1
Oral, systemic, long-term	0.12 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.24
Eye, local		Qualitative
Combined routes, systemic, long-term		0.769

### 8.3.5. Consumer exposure: Ink for ink jet printer and ball point pens (PC 18)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.092 mg/m <sup>3</sup> (External Tool: <i>Consexpo 5.0</i> )	0.054
Dermal, systemic, long-term	0.083 mg/kg bw/day (External Tool: <i>Consexpo 5.0</i> )	0.069
Eye, local		Qualitative
Combined routes, systemic, long-term		0.123

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

Analogue adaptations may be possible among the determinants driving consumer exposure (see exposure modifying factors in ConsExpo at <http://www.rivm.nl/en/Topics/C/ConsExpo>)

## 9. ES 9: Use by professional worker; Air Care applications by Professionals; Air Care Products; PC 3; SU 0

### 9.1. Title section

Air care products (PC 3)	
Other (SU 0)	
<b>Environment</b>	
CS 1: Wide dispersive indoor use	ERC 8a
<b>Worker</b>	
CS 2: Blending in open batch process	PROC 5
CS 3: Brushing application	PROC 10
CS 4: Spraying	PROC 11
CS 5: Article treatment by dipping	PROC 13

### 9.2. Conditions of use affecting exposure

#### 9.2.1. Control of environmental exposure: Wide dispersive indoor use (ERC 8a)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily wide dispersive use: <math>\leq 1.238E-4</math> tonnes/day</i>
<i>Percentage of tonnage used at regional scale: = 10 %</i>
<b>Conditions and measures related to sewage treatment plant</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Discharge rate of STP: <math>\geq 2E3</math> m<sup>3</sup>/d</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Receiving surface water flow rate: <math>\geq 1.8E4</math> m<sup>3</sup>/d</i>

#### 9.2.2. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour).</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>

<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 9.2.3. Control of worker exposure: Brushing application (PROC 10)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

### 9.2.4. Control of worker exposure: Spraying (PROC 11)

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 5 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 1 hour.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

**9.2.5. Control of worker exposure: Article treatment by dipping (PROC 13)**

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

**9.3. Exposure estimation and reference to its source****9.3.1. Environmental release and exposure: Wide dispersive indoor use (ERC 8a)**

Release route	Release rate	Release estimation method
Water	0.124 kg/day	ERC based
Air	0.124 kg/day	ERC based
Soil	0 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.319E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.728E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

**9.3.2. Worker exposure: Blending in open batch process (PROC 5)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

**9.3.3. Worker exposure: Brushing application (PROC 10)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.034 mg/m <sup>3</sup> (TRA Worker v3)	0.175
Dermal, systemic, long-term	1.646 mg/kg bw/day (TRA Worker v3)	0.823

Route of exposure and type of effects	Exposure estimate	RCR
Eye, local		Qualitative
Combined routes, systemic, long-term		0.998

#### 9.3.4. Worker exposure: Spraying (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.757 mg/m <sup>3</sup> (TRA Worker v3)	0.467
Dermal, systemic, long-term	0.429 mg/kg bw/day (TRA Worker v3)	0.214
Eye, local		Qualitative
Combined routes, systemic, long-term		0.682

#### 9.3.5. Worker exposure: Article treatment by dipping (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

## 10. ES 10: Consumer Use; Indoor air refreshing for general public; Air Care Products

### 10.1. Title section

Air care products (PC 3)	
<b>Environment</b>	
CS 1: Air refreshers indoor use	ERC 8a
<b>Consumer</b>	
CS 2: 1. Air freshener aerosol/spray use	PC 3
CS 3: 2.,3.,4. Air freshener diffusor applications	PC 3

### 10.2. Conditions of use affecting exposure

#### 10.2.1. Control of environmental exposure: Air refreshers indoor use (ERC 8a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 1.238E-4$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 10.2.2. Control of consumer exposure: 1. Air freshener aerosol/spray use (PC 3)

AISE P17, PC3 concentration aqueous <8%; non aqueous <13%(w/w)

##### Remarks on exposure data (Method: AISE REACT)

- Inhalation, systemic, long-term:  
Report date August 2012  
Aqueous aerosol spray with concentration of substance 8% (w/w; calculated from 0.477 mg/kg bw/day with 70 kg and 20 m<sup>3</sup>/day for general public;

Concentrations above 10% of the substance shall be labeled as irritant.

#### 10.2.3. Control of consumer exposure: 2.,3.,4. Air freshener diffusor applications (PC 3)

Non-aerosol evaporation of solid, liquid, gel: reed or plug-in or electrical diffusor; concentration  $\leq 80\%$  (w/w)

##### Remarks on exposure data (Method: AISE REACT)

- Inhalation, systemic, long-term:  
see AISE report

Concentrations above 10% of the substance shall be labeled as irritant.

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

#### 10.3.1. Environmental release and exposure: Air refreshers indoor use (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.001 kg/day	Release factor
Air	0.123 kg/day	Release factor
Soil	0 kg/day	Release factor

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.049E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

#### 10.3.2. Consumer exposure: 1. Air freshener aerosol/spray use (PC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.66 mg/m <sup>3</sup> (External Tool: <i>AISE REACT</i> )	0.976
Eye, local		Qualitative
Combined routes, systemic, long-term		0.976

#### 10.3.3. Consumer exposure: 2.,3.,4. Air freshener diffusor applications (PC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.1 mg/m <sup>3</sup> (External Tool: <i>AISE REACT</i> )	0.059
Eye, local		Qualitative
Combined routes, systemic, long-term		0.059

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

Analogue adaptations may be possible among the determinants driving consumer exposure (see exposure modifying factors in *AISE REACT* at [http://www.aise.eu/reach/?page=exposureass\\_sub3](http://www.aise.eu/reach/?page=exposureass_sub3))



## 11. ES 11: Use by professional worker; Use in Additives and Coalescents; Functional Fluids and Additives; PC 34; SU 0

### 11.1. Title section

Textile dyes, finishing and impregnating products; including bleaches and other processing aids; (PC 34) Other (SU 0)	
<b>Environment</b>	
CS 1: Coatings indoor	ERC 8a
<b>Worker</b>	
CS 2: Partly open batch process	PROC 4
CS 3: Blending in open batch process	PROC 5
CS 4: External Transfer Processes	PROC 8a
CS 5: Internal Transfer Processes	PROC 8b
CS 6: Roller Application or Brushing	PROC 10
CS 7: Spraying	PROC 11
CS 8: Article treatment by dipping	PROC 13
CS 9: Laboratory Use	PROC 15

### 11.2. Conditions of use affecting exposure

#### 11.2.1. Control of environmental exposure: Coatings indoor (ERC 8a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 2.75E-5$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to sewage treatment plant</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 11.2.2. Control of worker exposure: Partly open batch process (PROC 4)

<b>Product (article) characteristics</b>
Concentration of substance in mixture: >25%
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Avoid carrying out activities involving exposure for more than 1 hour.
<b>Technical and organisational conditions and measures</b>
Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .
Use in semi-closed process with opportunity for exposure
Basic (professional) exposure controls assumed.

<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 11.2.3. Control of worker exposure: Blending in open batch process (PROC 5)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 11.2.4. Control of worker exposure: External Transfer Processes (PROC 8a)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>

**11.2.5. Control of worker exposure: Internal Transfer Processes (PROC 8b)**

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Use in semi-closed process with opportunity for exposure</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**11.2.6. Control of worker exposure: Roller Application or Brushing (PROC 10)**

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands (960 cm<sup>2</sup>)</i>

**11.2.7. Control of worker exposure: Spraying (PROC 11)**

<b>Product (article) characteristics</b>
<i>Limit the substance content in the product to 25 % .</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>

<i>Provide a basic standard of general ventilation (1 to 3 air changes per hour) .</i>
<i>Local exhaust ventilation - efficiency of at least 80%</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands and upper wrists (1500 cm<sup>2</sup>)</i>

### 11.2.8. Control of worker exposure: Article treatment by dipping (PROC 13)

<b>Product (article) characteristics</b>
<i>Concentration of substance in mixture: &gt;25%</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 15 minutes.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.</i>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>
<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: Two hands face (480 cm<sup>2</sup>)</i>

### 11.2.9. Control of worker exposure: Laboratory Use (PROC 15)

<b>Product (article) characteristics</b>
<i>Covers percentage substance in the product up to 100 %.</i>
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
<i>Avoid carrying out activities involving exposure for more than 4 hours.</i>
<b>Technical and organisational conditions and measures</b>
<i>Provide a good standard of controlled ventilation (5 to 10 air changes per hour) .</i>
<i>Basic (professional) exposure controls assumed.</i>
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
<i>Wear suitable eye protection.; For further specification, refer to section 8 of the SDS.</i>
<i>For further specification for exposure controls/personal protection, refer to section 8 of the SDS.</i>
<b>Other conditions affecting workers exposure</b>

<i>Indoor use</i>
<i>Assumes elevated process temperature up to 40 °C</i>
<i>Skin surface potentially exposed: One hand face only (240 cm<sup>2</sup>)</i>

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

#### 11.3.1. Environmental release and exposure: Coatings indoor (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.027 kg/day	ERC based
Air	0.027 kg/day	ERC based
Soil	0 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.195E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

#### 11.3.2. Worker exposure: Partly open batch process (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.954 mg/m <sup>3</sup> (TRA Worker v3)	0.501
Dermal, systemic, long-term	0.686 mg/kg bw/day (TRA Worker v3)	0.343
Eye, local		Qualitative
Combined routes, systemic, long-term		0.844

#### 11.3.3. Worker exposure: Blending in open batch process (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

#### 11.3.4. Worker exposure: External Transfer Processes (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.723 mg/m <sup>3</sup> (TRA Worker v3)	0.292
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.978

#### 11.3.5. Worker exposure: Internal Transfer Processes (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686

Route of exposure and type of effects	Exposure estimate	RCR
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

### 11.3.6. Worker exposure: Roller Application or Brushing (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.034 mg/m <sup>3</sup> (TRA Worker v3)	0.175
Dermal, systemic, long-term	1.646 mg/kg bw/day (TRA Worker v3)	0.823
Eye, local		Qualitative
Combined routes, systemic, long-term		0.998

### 11.3.7. Worker exposure: Spraying (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.591 mg/m <sup>3</sup> (TRA Worker v3)	0.1
Dermal, systemic, long-term	1.286 mg/kg bw/day (TRA Worker v3)	0.643
Eye, local		Qualitative
Combined routes, systemic, long-term		0.743

### 11.3.8. Worker exposure: Article treatment by dipping (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.477 mg/m <sup>3</sup> (TRA Worker v3)	0.25
Dermal, systemic, long-term	1.371 mg/kg bw/day (TRA Worker v3)	0.686
Eye, local		Qualitative
Combined routes, systemic, long-term		0.936

### 11.3.9. Worker exposure: Laboratory Use (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	4.432 mg/m <sup>3</sup> (TRA Worker v3)	0.751
Dermal, systemic, long-term	0.34 mg/kg bw/day (TRA Worker v3)	0.17
Eye, local		Qualitative
Combined routes, systemic, long-term		0.921

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

Analogue adaptations may be possible among the determinants driving workers exposure (see exposure modifying factors in ECETOC TRA at [www.ecetoc.org/index.php?page=tra](http://www.ecetoc.org/index.php?page=tra)).

## 12. ES 12: Consumer Use; Plant protection uses, aerosols indoor/outdoor; Functional Fluids and Additives

### 12.1. Title section

Textile dyes, finishing and impregnating products; including bleaches and other processing aids; (PC 34)	
<b>Environment</b>	
CS 1: Insecticide	ERC 8d, ERC 8a
<b>Consumer</b>	
CS 2: Insecticide for spraying plants indoor use	PC 8

### 12.2. Conditions of use affecting exposure

#### 12.2.1. Control of environmental exposure: Insecticides (ERC 8d)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily wide dispersive use: $\leq 5.5E-7$ tonnes/day
Percentage of tonnage used at regional scale: = 10 %
<b>Conditions and measures related to treatment of waste (including article waste)</b>
Dispose of waste or used sacks/containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Municipal sewage treatment plant (STP): Yes (Water: 67.46%)
Discharge rate of STP: $\geq 2E3$ m <sup>3</sup> /d
Application of the STP sludge on agricultural soil: Yes
Receiving surface water flow rate: $\geq 1.8E4$ m <sup>3</sup> /d

#### 12.2.2. Control of consumer exposure: Insecticide for spraying plants indoor use (PC 8)

##### Populations

body weight 65 kilogram

##### Products

weight fraction compound 60 %

##### Aggregate Exposures

Total chronic potential dose (mg/kg/day): 0.44

Total chronic systemic dose (mg/kg/day): 0.44

Inhalation chronic potential dose (mg/kg/day): 0.037

Inhalation chronic systemic dose (mg/kg/day): 0.037

Dermal chronic potential dose (mg/kg/day): 0.38

Dermal chronic systemic dose (mg/kg/day): 0.38

Oral chronic potential dose (mg/kg/day): 0.028

Oral chronic systemic dose (mg/kg/day): 0.028

Inhalation model: Exposure to vapour : instantaneous release

weight fraction compound	60	%
exposure duration	15	minute
room volume	35	m <sup>3</sup>
ventilation rate	0.5	1/hr
applied amount	1	gram

Uptake model: Fraction

uptake fraction	1	fraction
inhalation rate	24	liter/min

Dermal model: Direct dermal contact with product : instant application

weight fraction compound	60	%
exposed area	8.6E2	cm <sup>2</sup>
applied amount	0.1	gram

Uptake model: fraction

uptake fraction	1	fraction
-----------------	---	----------

Oral model: Oral exposure to product : constant rate

weight fraction compound	30	%
ingestion rate	1	mg/min
exposure time	15	minute

Uptake model: Fraction

uptake fraction	1	fraction
-----------------	---	----------

Remarks on exposure data (Method: ConsExpo 5.0)

- Inhalation, systemic, long-term:  
Report date: February 2013;
- Dermal, systemic, long-term:  
see Consexpo 5.0 report
- Oral, systemic, long-term:  
see Consexpo 5.0 report

Concentrations above 10% of the substance shall be labeled as irritant.

## 12.3. Exposure estimation and reference to its source

### 12.3.1. Environmental release and exposure: Insecticides (ERC 8d)

Release route	Release rate	Release estimation method
Water	5.5E-4 kg/day	ERC based
Air	5.5E-4 kg/day	ERC based



Release route	Release rate	Release estimation method
Soil	1.1E-4 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.045E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01

### 12.3.2. Consumer exposure: Insecticide for spraying plants indoor use (PC 8)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.07 mg/m <sup>3</sup> (External Tool: <i>Consexpo 4.1</i> )	0.041
Dermal, systemic, long-term	0.38 mg/kg bw/day (External Tool: <i>Consexpo 4.1</i> )	0.317
Oral, systemic, long-term	0.028 mg/kg bw/day (External Tool: <i>Consexpo 4.1</i> )	0.056
Eye, local		Qualitative
Combined routes, systemic, long-term		0.414

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

Analogue adaptations may be possible among the determinants driving consumer exposure (see exposure modifying factors in ConsExpo at <http://www.rivm.nl/en/Topics/C/ConsExpo>)

## 13. ES 13: Consumer Use; Cosmetics; Cosmetic, personal care and perfume additives

### 13.1. Title section

Cosmetics, personal care products (PC 39)	
<b>Environment</b>	
CS 1: Cosmetics	ERC 8d

### 13.2. Conditions of use affecting exposure

#### 13.2.1. Control of environmental exposure: Cosmetics (ERC 8d)

<b>Amount used, frequency and duration of use (or from service life)</b>
<i>Daily wide dispersive use: <math>\leq 2.75E-5</math> tonnes/day</i>
<i>Percentage of tonnage used at regional scale: = 10 %</i>
<b>Conditions and measures related to treatment of waste (including article waste)</b>
<i>Dispose of waste or used sacks/containers according to local regulations.</i>
<b>Other conditions affecting environmental exposure</b>
<i>Municipal sewage treatment plant (STP): Yes (Water: 67.46%)</i>
<i>Assumed domestic sewage treatment plant flow</i>
<i>Application of the STP sludge on agricultural soil: Yes</i>
<i>Receiving surface water flow rate: <math>\geq 1.8E4</math> m<sup>3</sup>/d</i>

No exposure scenarios for PC 28 and PC 39 are included in this dossier. Assessment is done separately following the EU Cosmetic Products Regulation, EU Regulation (EC) No 1223/2009.

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

#### 13.3.1. Environmental release and exposure: Cosmetics (ERC 8d)

Release route	Release rate	Release estimation method
Water	0.027 kg/day	ERC based
Air	0.027 kg/day	ERC based
Soil	0.006 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Man via Environment - Inhalation	1.318E-5 mg/m <sup>3</sup>	< 0.01
Man via Environment - Oral	1.195E-4 mg/kg bw/day	< 0.01
Man via Environment – combined routes		< 0.01