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

### 1.1. Product identifier

#### Trade name **ANTIFROGEN N**

Material number: 107601

Chemical nature: Monoethylene glycol (1,2-ethane diol) with corrosion inhibitors

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

## Relevant identified uses of the substance or mixture

Industry sector : **Functional Fluids** Type of use : Brine for refrigeration

Exposure scenarios: see annex

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

## Identification of the company

Clariant Produkte (Deutschland) GmbH 65926 Frankfurt am Main Telephone no. : +49 69 305 18000

## Information about the substance/mixture

**BU Industrial & Consumer Specialties** Product Stewardship e-mail: SDS.Europe@clariant.com

#### 1.4. Emergency telephone number

00800-5121 5121 (24 h)

## **SECTION 2: Hazards identification**

#### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4

H302: Harmful if swallowed.

Specific target organ toxicity - repeated

H373: May cause damage to organs through prolonged or repeated exposure.

exposure, Category 2

### 2.2 Label elements

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

Hazard pictograms



: Warning

: H302

Signal word

Hazard statements

Harmful if swallowed.



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	H373	May cause damage to organs through prolonged or repeated exposure.
Precautionary statements	Prevention:	
	P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
	P264	Wash skin thoroughly after handling.
	P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
	Response:	
	P314	Get medical advice/ attention if you feel unwell.
	P337 + P313	If eye irritation persists: Get medical advice/ attention.
	Disposal:	
	P501	Dispose of contents/ container to an approved waste disposal plant.

### 2.3 Other hazards

After consideration of all available toxicity and ecotoxicity data it is concluded that the substance does not fulfil the PBT or vPvB criteria.

No additional hazards are known except those derived from the labelling.

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

### 3.2 Mixtures

### Hazardous components

Chemical name	CAS-No. EC-No. Registration number	Classification	Concentration (% w/w)
Ethanediol	107-21-1 203-473-3 01-2119456816-28 01-2119456816-28- 0000 01-2119456816-28- 0003 01-2119456816-28- XXXX	Acute Tox. 4; H302 STOT RE 2; H373 Acute Tox. 4; H302 STOT RE 2; H373	>= 90 - <= 95

For explanation of abbreviations see section 16.

## **SECTION 4: First aid measures**

## 4.1 Description of first aid measures

General advice

: Remove/Take off immediately all contaminated clothing.

If inhaled

: Get medical attention if symptoms occur.



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In case of skin contact	: In case of contact, immediately flush skin with plenty of water.
In case of eye contact	: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
If swallowed	: Get medical attention immediately.
4.2 Most important symptoms an	d effects, both acute and delayed
Symptoms	: No symptoms known currently.
Risks	: No hazards known at this time.
4.3 Indication of any immediate n	nedical attention and special treatment needed
Treatment	: Treat symptomatically.

## **SECTION 5: Firefighting measures**

<b>5.1 Extinguishing media</b> Suitable extinguishing media	: Water spray jet Alcohol-resistant foam Carbon dioxide (CO2) Dry powder
5.2 Special hazards arising from th	ne substance or mixture
Specific hazards during firefighting	: In case of fires, hazardous combustion gases are formed: Carbon monoxide (CO) Nitrogen oxides (NOx)
5.3 Advice for firefighters	
Special protective equipment for firefighters	: Self-contained breathing apparatus
SECTION 6: Accidental release	measures
6.1 Personal precautions, protectiv	ve equipment and emergency procedures
Personal precautions	: Ensure adequate ventilation. Wear suitable protective equipment.

## 6.2 Environmental precautions

Environmental precautions	:	Do not allow to enter drains or waterways
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## 6.3 Methods and material for containment and cleaning up

Methods for cleaning up	: Soak up with inert absorbent material (e.g. sand, silica gel,
	acid binder, universal binder, sawdust).



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Can be landfilled or incinerated, when in compliance with local regulations.

#### 6.4 Reference to other sections

Information regarding Safe handling, see chapter 7., For personal protection see section 8., For disposal considerations see section 13.

## **SECTION 7: Handling and storage**

### 7.1 Precautions for safe handling

Advice on safe handling	:	Handle and open container with care. Provide adequate ventilation.
Advice on protection against fire and explosion	:	Observe the general rules of industrial fire protection
Hygiene measures	:	Keep away from food and drink.
7.2 Conditions for safe storage, in	nclu	uding any incompatibilities
Advice on common storage	:	Do not store with alkalies Do not store with strong oxidizing agents
7.3 Specific end use(s)		
Specific use(s)	:	No further recommendations.

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

### 8.1 Control parameters

## **Occupational Exposure Limits**

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis	
Ethanediol	107-21-1	TWA	20 ppm 52 mg/m3	2000/39/EC	
Further information	Identifies the possibility of significant uptake through the skin, Indicative				
		STEL	40 ppm 104 mg/m3	2000/39/EC	
Further information	Identifies the possibility of significant uptake through the skin, Indicative				

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

ethanediol	: End Use: Workers
CAS-No.: 107-21-1	Exposure routes: Dermal
	Potential health effects: Long-term systemic effects
	Value: 106 mg/kg bw/day
	DNEL
	End Use: Workers
	Exposure routes: Inhalation
	•



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Version : 5 - 2 / EU	Date of printing : 18.12.2017 Potential health effects: Long-term local effects Value: 35 mg/m3
	DNEL End Use: General population Exposure routes: Dermal Potential health effects: Long-term systemic effects Value: 53 mg/kg bw/day DNEL End Use: General population Exposure routes: Inhalation Potential health effects: Long-term local effects Value: 7 mg/m3
Predicted No Effect Concent	tration (PNEC) according to Regulation (EC) No. 1907/2006:
ethanediol CAS-No.: 107-21-1	<ul> <li>Fresh water Value: 10 mg/l salt water Value: 1 mg/l Water (intermittent release) Value: 10 mg/l Fresh water sediment Value: 20,9 mg/kg dry weight (d.w.) Soil Value: 1,53 mg/kg dry weight (d.w.) Sewage treatment plant Value: 199,5 mg/l</li> </ul>
8.2 Exposure controls	
Personal protective equipme	ent
Eye protection	: Depending on the risk, wear sufficient eye protection (safety glasses with side protection or goggles, and if necessary, face shield.)
Hand protection Break through time Glove thickness Remarks	: 480 min : 0,7 mm : Long-term exposure Impervious butyl rubber gloves
Break through time Glove thickness Remarks	<ul> <li>30 min</li> <li>0,4 mm</li> <li>For short-term exposure (splash protection): Nitrile rubber gloves.</li> </ul>
Remarks	: These types of protective gloves are offered by various manufacturers. Please note the manufacturers' detailed statements, especially about the minimum thickness and the minimum breakthrough time. Consider also the particular working conditions under which the gloves are being used.
Respiratory protection	<ul> <li>Use respiratory protection in case of insufficient exhaust ventilation or prolonged exposure</li> <li>Full mask to standard DIN EN 136</li> <li>Filter A (organic gases and vapours) to standard DIN EN 141</li> </ul>



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	The use of filter apparatus presupposes that the environment atmosphere contains at least 17% oxygen by volume, and does not exceed the maximum gas concentration, usually 0.5% by volume. Relevant guidelines to be considered include EN 136/141/143/371/372 as well as other national regulations.	
Protective measures	: Do not inhale vapours Avoid contact with skin and eyes.	

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

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9.1 Information on basic physical Appearance		<b>d chemical properties</b> Liquid
Particle size :		Not applicable
Colour	:	yellow
Odour	:	slightly perceptible
Odour Threshold	:	not tested.
рН	:	approx. 8 Concentration: 100 g/l (20 °C) Method: DIN 19268
Melting point	:	-32 °C Method: DIN 51583
Boiling point	:	approx. 165 °C (1.013 hPa) Method: ASTM D 1120
		166 °C (1.013 hPa) Method: ASTM D 1120
Flash point	:	119 °C Method: ASTM D6450 (closed cup)
Evaporation rate	:	not tested.
Upper explosion limit	:	not tested.
Lower explosion limit Combustion number :	:	3 %(V) Data relate to solvent Not applicable



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Vapour pressure	: < 0,01 kPa (20 °C) Method: Calculated by Syracuse.
Relative vapour density	: not tested.
Density	: 1,1138 g/cm3 (20 °C) Method: DIN 51757
Bulk density	: Not applicable
Solubility(ies) Water solubility	: completely miscible (20 °C)
Solubility in other solvents	: not tested. Solvent: fat
Partition coefficient: n- octanol/water	: Not applicable
Auto-ignition temperature	: > 400 °C Method: DIN 51794
Decomposition temperature	<ul> <li>&gt; 300 °C</li> <li>Method: DSC</li> <li>Measurement under nitrogen No decomposition up to 300 °C.</li> </ul>
Viscosity Viscosity, dynamic	: 20,3 mPa.s (20 °C)
Viscosity, kinematic	: 20,3 mm2/s (20 °C) Method: DIN 51562
Explosive properties	: Not explosive Method: Expert judgement
Oxidizing properties	: The substance or mixture is not classified as oxidizing.
	Method: Expert judgement
9.2 Other information	
Surface tension	: 33,8 mN/m
Molecular weight	: Not applicable



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## **SECTION 10: Stability and reactivity**

#### **10.1 Reactivity**

See section 10.3. "Possibility of hazardous reactions"

#### 10.2 Chemical stability

Stable under normal conditions. hygroscopic

### 10.3 Possibility of hazardous reactions

Hazardous reactions	: Reactions with alkalies.
	Reactions with oxidising agents.

Stable

#### 10.4 Conditions to avoid

Conditions to avoid : None kr

## 10.5 Incompatible materials

own
)W

#### **10.6 Hazardous decomposition products**

When handled and stored appropriately, no dangerous decomposition products are known

## **SECTION 11: Toxicological information**

## 11.1 Information on toxicological effects

Acute toxicity	
Product:	
Acute oral toxicity	: Acute toxicity estimate: 519,54 mg/kg Method: Calculation method
Acute inhalation toxicity	<ul> <li>LC50 (Rat, male and female): &gt; 2,5 mg/l Exposure time: 6 h Remarks: Information refers to the main component.</li> </ul>
Acute dermal toxicity	: LD50 (Mouse, male and female): > 3.500 mg/kg Remarks: Information refers to the main component.
Components:	
Ethanediol:	
Acute oral toxicity	: LD50 (Rat, male and female): 22.000 mg/kg Method: Other GLP: no
Acute inhalation toxicity	: LC50 (Rat, male and female): > 2,5 mg/l Exposure time: 6 h Method: Other



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GLP: yes

Acute dermal toxicity : LD50 (Mouse, male and female): > 3.500 mg/kg Method: Other GLP: yes

### Skin corrosion/irritation

### Product:

Species: Rabbit Result: No skin irritation Remarks: Information refers to the main component.

### **Components:**

Ethanediol: Species: Rabbit Exposure time: 20 h Method: BASF test Result: No skin irritation GLP: no

#### Serious eye damage/eye irritation

#### Product:

Remarks: not tested.

## **Components:**

Ethanediol: Species: rabbit eye Exposure time: 24 h Method: BASF test Result: non-irritant GLP: no

#### Respiratory or skin sensitisation

### Product:

Test Type: Guinea pig maximization test Species: Guinea pig Method: Magnusson/Kligman Result: non-sensitizing Remarks: Information refers to the main component.

#### **Components:**

## Ethanediol:

Test Type: Maximisation Test Exposure routes: Skin contact Species: Guinea pig Method: OECD Test Guideline 406 Result: Does not cause skin sensitisation. GLP: yes



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Germ cell mutagenicity	
Product:	
Germ cell mutagenicity- Assessment	: It is concluded that the product is not mutagenic based on evaluation of several mutagenicity tests.
	Information refers to the main component.
Components:	
Ethanediol:	Test Turner Arrest test
Genotoxicity in vitro	: Test Type: Ames test Species: Salmonella typhimurium
	Concentration: 33 - 5000 µg/plate
	Metabolic activation: with and without
	Method: OECD Test Guideline 471
	Result: negative GLP: yes
	: Test Type: Ames test
	Species: Escherichia coli
	Concentration: 33 - 5000 µg/plate Metabolic activation: with and without
	Method: OECD Test Guideline 471
	Result: negative
	GLP: yes
Genotoxicity in vivo	: Test Type: Dominant lethal assay
	Species: Rat (male and female) Strain: Fischer F344
	Application Route: oral (feed)
	Exposure time: 3 generation
	Dose: 40 - 200 - 1000 mg/kg
	Method: Other Result: negative
	GLP: no
Germ cell mutagenicity-	: It is concluded that the product is not mutagenic based on
Assessment	evaluation of several mutagenicity tests.
Carcinogenicity	
Product:	
Carcinogenicity - Assessment	: No evidence of carcinogenicity in animal studies.
	Information refers to the main component.
Components:	
Ethanediol:	
Carcinogenicity -	: Not classifiable as a human carcinogen.



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Assessment	
Reproductive toxicity	
Product:	
Reproductive toxicity - Assessment	: No indications of toxic effects were observed in reproduction studies in animals.
	No reproductive toxicity to be expected.
	Information refers to the main component.
	Information refers to the main component.
Components:	
Ethanediol:	
Effects on fertility	: Species: Rat Sex: male and female Dose: 40 - 200 - 1000 Frequency of Treatment: daily Fischer F344 Application Route: oral (feed) Test period: 3 generations NOAEL: > 1.000 mg/kg, F1: > 1.000 mg/kg, F2: > 1.000 mg/kg, Method: Other GLP: no
Effects on foetal development	<ul> <li>Species: Rat Application Route: oral (gavage) Exposure time: gestation day 6-15 Dose: 150 - 500 - 1000 - 2500 mg/kg Group: yes 500 mg/kg 1.000 mg/kg Number of exposures: daily Method: Other GLP: yes</li> </ul>
Reproductive toxicity - Assessment	: No reproductive toxicity to be expected. No teratogenic effects to be expected.
STOT - single exposure	
Product:	

## Components:

#### Ethanediol:

Assessment: The substance or mixture is not classified as specific target organ toxicant, single exposure.



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## STOT - repeated exposure

## Product:

Remarks: not tested.

## Components:

**Ethanediol:** Target Organs: Kidney Assessment: May cause damage to organs through prolonged or repeated exposure.

## **Repeated dose toxicity**

### Product:

Species: Rat, male and female NOAEL: 200 mg/kg Application Route: oral (gavage) Method: OECD Test Guideline 407

Species: Rat, male NOAEL: 150 mg/kg Application Route: oral (feed) Method: OECD Test Guideline 408

Species: Dog, male NOAEL: 2,22 mg/kg Application Route: Dermal Method: OECD Test Guideline 410 Remarks: Information refers to the main component.

## Components:

Ethanediol: Species: Rat, male NOAEL: 150 mg/kg Application Route: oral (feed) Exposure time: 16 w Number of exposures: daily Dose: 50 - 150 - 500 - 1000 mg/kg Group: yes Method: OECD Test Guideline 408 GLP: yes

Species: Dog, male NOAEL: ca. 2.200 mg/kg Application Route: Skin contact Exposure time: 4 w Number of exposures: daily Dose: 0,5 - 2 - 8 ml/kg Group: yes Method: OECD Test Guideline 410 GLP: yes



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## Aspiration toxicity

### Product:

no data available

## **Components:**

Ethanediol: No aspiration toxicity classification

### **Further information**

### Product:

Remarks: Kidney injury may occur.

Remarks: Poisoning affects the central nervous system

Remarks: The classification was made by the conventional (calculation) method of the CLP Regulation (EC) No 1272/2008.

## **SECTION 12: Ecological information**

#### 12.1 Toxicity

Product:		
Toxicity to fish	:	LC0 (Leuciscus idus (Golden orfe)): 1.000 mg/l
		LL50 (Danio rerio (zebra fish)): > 100 mg/l Exposure time: 96 h Test Type: static test Method: OECD Test Guideline 203 GLP: yes Remarks: By analogy with a product of similar composition
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Information refers to the main component.
Toxicity to algae	:	EC50 (Selenastrum capricornutum (green algae)): 6.500 - 13.000 mg/l Exposure time: 96 h Remarks: Information refers to the main component.
Toxicity to bacteria	:	EC20 (activated sludge): > 1.995 mg/l Exposure time: 30 min Method: ISO 8192 Remarks: Information refers to the main component.
Components:		
Ethanediol:		
Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 72.860 mg/l



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	Exposure time: 96 h Test Type: static test Analytical monitoring: yes Method: EPA GLP: no Remarks: The details of the toxic effect relate to the nominal concentration.
Toxicity to daphnia and other aquatic invertebrates	<ul> <li>EC50 (Daphnia magna (Water flea)): &gt; 100 mg/l Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes</li> </ul>
Toxicity to algae	: EC50 (Chlamydomonas angulosa. Green algae): 3.536 mg/l Exposure time: 96 h Analytical monitoring: no Method: Estimated (Ecosar) GLP: no
Toxicity to bacteria	<ul> <li>EC20 (activated sludge, domestic): &gt; 1.995 mg/l End point: Bacteria toxicity (respiration inhibition) Exposure time: 0,5 h Analytical monitoring: no Method: ISO 8192 GLP: no Remarks: By analogy with a product of similar composition</li> </ul>
Toxicity to fish (Chronic toxicity)	: Chronic Toxicity Value: 2.629 mg/l Exposure time: 30 d End point: Other Species: Fish Method: Other GLP: no Remarks: The details of the toxic effect relate to the nominal concentration.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	<ul> <li>NOEC: 8.590 mg/l Exposure time: 7 d End point: Reproduction rate Species: Ceriodaphnia spec. Test Type: semi-static test Analytical monitoring: yes Method: Other GLP: No information available. Remarks: The details of the toxic effect relate to the nominal concentration.</li> </ul>
Toxicity to soil dwelling organisms	: Remarks: The study is not necessary from a scientific perspective.
	: Remarks: The study is not necessary from a scientific



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	perspective.
Sediment toxicity	: Remarks: The study is not necessary from a scientific perspective.
Toxicity to terrestrial organisms	: Remarks: The study is not necessary from a scientific perspective.
12.2 Persistence and degradabili	ty
Product:	
Biodegradability	<ul> <li>Biodegradation: 90 - 100 % Exposure time: 10 d Method: OECD Test Guideline 301A Remarks: Readily biodegradable, according to appropriate OECD test. Information refers to the main component.</li> </ul>
<u>Components:</u> Ethanediol: Biodegradability	: Test Type: aerobic Inoculum: activated sludge Concentration: 53 mg/l Result: Readily biodegradable Biodegradation: 90 - 100 % Related to: DOC decrease Exposure time: 10 d Method: OECD Test Guideline 301A GLP: yes
12.3 Bioaccumulative potential	
Product:	
Bioaccumulation	: Remarks: not tested.
Components: Ethanediol: Bioaccumulation	: Remarks: Due to the low logPow bioaccumulation is not expected
12.4 Mobility in soil	
Product: Distribution among environmental compartments	: Remarks: not tested.
Components: Ethanediol: Distribution among environmental compartments	: Adsorption/Soil Medium:water - soil



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	log Koc: 0 Method: other (calculated)
12.5 Results of PBT and vPvB ass	essment
Product:	
Assessment	: After consideration of all available toxicity and ecotoxicity data it is concluded that the substance does not fulfil the PBT or vPvB criteria.
	Remarks: Information refers to the main component.
<u>Components:</u> Ethanediol: Assessment	: This substance is not considered to be persistent, bioaccumulating and toxic (PBT)
12.6 Other adverse effects	
Product:	
Additional ecological information	<ul> <li>Remarks: If handled correctly it causes no disturbance in treatment plants.</li> <li>The classification was made by the conventional (calculation) method of the CLP Regulation (EC) No 1272/2008.</li> </ul>
<u>Components:</u> Ethanediol:	
Environmental fate and pathways	: not available
Additional ecological information	: Remarks: Do not allow to enter ground water, waterways or waste water.

## SECTION 13: Disposal considerations

13.1 Waste treatment methods	
Product	: Dispose of in accordance with local regulations.
Contaminated packaging	<ul> <li>Uncontaminated packaging may be reused Packaging that cannot be cleaned should be disposed of as product waste</li> </ul>



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### Section 14.1. to 14.5.

ADR	not restricted
ADN	not restricted
RID	not restricted
ΙΑΤΑ	not restricted
IMDG	not restricted

#### 14.6. Special precautions for user

See sections 6 to 8 of this Safety Data Sheet.

## 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code (International Bulk Chemicals Code)

No transport as bulk according IBC - Code.

## **SECTION 15: Regulatory information**

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

Volatile organic compounds	<ul> <li>Directive 1999/13/EC on the limitation of emissions of volatile organic compounds</li> <li>Remarks: According to the composition the product contains no VOC component as defined by Directive 1999/13/EC.</li> </ul>
	Directive 2004/42/EC Remarks: According to the composition, the product contains no VOC components as defined by Directive 2004/42/EC.
Other regulations	<ul> <li>Apart from the data/regulations specified in this chapter, no further information is available concerning safety, health and environmental protection.</li> </ul>

#### 15.2 Chemical safety assessment

Chemical Safety Assessments (CSAs) are available for one or more of the component substances contained in this product.

## **SECTION 16: Other information**

Full text of H-Statements H302 H373	<ul><li>Harmful if swallowed.</li><li>May cause damage to organs through prolonged or repeated exposure.</li></ul>
Full text of other abbreviatio Acute Tox. STOT RE	ns : Acute toxicity : Specific target organ toxicity - repeated exposure
Further information Other information	: Observe national and local legal requirements



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## Exposure Scenario(s)

Number	Title
ES 1	Industrial use; Use as an intermediate
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15 - ERC6a
	Ethane-1,2-diol
ES 2	Industrial use; Industrial use of processing aids in processes and
	products, not becoming part of articles
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15 - ERC4
	Ethane-1,2-diol
ES 3	Industrial use; Distribution of substance
	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 - ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7
	Ethane-1,2-diol
ES 4	Industrial use; Formulation [mixing] of preparations and/or re-packaging
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 - ERC2
	Ethane-1,2-diol
ES 5	Industrial use; Use in polymer production
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC15 - ERC6c
	Ethane-1,2-diol
ES 6	Industrial use; Paints, pastels, pigment powders, Coatings
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15 - ERC4
	Ethane-1,2-diol
ES 7	Professional use; Paints, pastels, pigment powders, Coatings, Adhesives, sealants, Foaming, Use in polymer processing
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19 - ERC8a, ERC8c, ERC8d, ERC8f
	Ethane-1,2-diol
ES 8	Consumer use; Coatings and paints, thinners, paint removers, Surface
	treatment
	PC9a, PC15, PC18, PC31, PC24, PC34 - ERC8a, ERC8c, ERC8d, ERC8f
	Ethane-1,2-diol
ES 9	Industrial use; Use in cleaning agents
	PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 - ERC4
	Ethane-1,2-diol
ES 10	Professional use; Use in cleaning agents



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	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC - ERC8a, ERC8d
	Ethane-1,2-diol
ES 11	Consumer use; Use in cleaning agents
	PC35 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 12	Industrial use; Use in lubricants
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 - ERC4, ERC7
	Ethane-1,2-diol
ES 13	Industrial use; Metal working fluids
	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 - ERC4
	Ethane-1,2-diol
ES 14	Professional use; Metal working fluids
	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC1 PROC13, PROC17 - ERC8a, ERC8d
	Ethane-1,2-diol
ES 15	Professional use; Use in agrochemicals
	PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC11, PROC13 - ERC8 ERC8d
	Ethane-1,2-diol
ES 16	Industrial use; Use in functional fluids
	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 - ERC7
	Ethane-1,2-diol
ES 17	Professional use; Use in functional fluids
	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9, PROC20 - ERC9a, ERC9b
	Ethane-1,2-diol
ES 18	Consumer use; Heat transfer fluids, Hydraulic fluids
	PC16, PC17 - ERC9a, ERC9b
	Ethane-1,2-diol
ES 19	Professional use; Anti-freeze and de-icing products
	PROC1, PROC2, PROC8a, PROC8b, PROC11 - ERC8d
	Ethane-1,2-diol
ES 20	Consumer use; Anti-freeze and de-icing products
	PC4 - ERC8d
	Ethane-1,2-diol
ES 21	Industrial use, Professional use; Laboratory use
	PROC15 - ERC8a
	Ethane-1,2-diol
ES 22	Industrial use; Use in water treatment agents



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	PROC1, PROC2, PROC3, PROC4, PROC8a, PR	OC8b, PROC13 - ERC3, ERC4
	Ethane-1,2-diol	
ES 23	Consumer use; Adhesives, sealants	
	PC1 - ERC8c, ERC8f	
	Ethane-1,2-diol	
ES 24	Industrial use; Manufacture of substance, Coatings, Use in polymer production	Adhesives, sealants, Foaming,
	PROC1, PROC2, PROC3, PROC4, PROC5, PRO PROC10, PROC13, PROC14, PROC15 - ERC2, I	
	Ethane-1,2-diol	
ES 25	Consumer use; Insulation foams	
	PC32 - ERC8c, ERC8f	
	Ethane-1,2-diol	

## 1. ES 1: Industrial use; Use as an intermediate

## 1.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Industrial use (Industrial use resulting in manufacture of another substance (use of intermediates))	ERC6a
Worke	ITS	
CS2:	Industrial use (Use in closed process, no likelihood of exposure)	PROC1
CS3:	Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC2
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5
CS6:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Use as laboratory reagent)	PROC15

## **1.2. ES 1** Conditions of use affecting exposure

1.2.1 ES 1 - CS 1: Control of environmental exposure: Industrial use (Industrial use resulting in manufacture of another substance (use of intermediates)) (ERC6a)



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Remarks : As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

## 1.2.2 ES 1 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Product characteristics Concentration of the Substance in Mixture/Article	<= 100 %		
	E Low volatile liquid 0,123 hPa		
Frequency and duration of use			
	: <= 480 min		
Frequency of use	: <= 240 days per year		
Human factors not influenced by risk	management		
	Palm of one hand		
Exposed skin surface assumed			
Other operational conditions affecting Outdoor / Indoor	<b>j workers exposure</b> Indoor		
Risk management measures Technical conditions and measures	Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.		
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.			
1.2.3 ES 1 - CS 3: Control of worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)			
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %		
	: Low volatile liquid : 0,123 hPa		

Frequency and duration of use Exposure duration : <= 480 min



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Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affect	ing workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: Use in closed, continuous process with occasional controlled
	exposure
	No specific measures identified.
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where ) (PROC3, PROC4)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>

Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in batch and other process (synthesis) where opportunity for exposure arises

#### Other operational conditions affecting workers exposure Outdoor / Indoor

Risk management measures Technical conditions and : Use in closed batch process (synthesis or formulation) measures : Use in batch and other process (synthesis) where opportunity Note for exposure arises No specific measures identified.

: Indoor



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yond the REACH Chemical Safety Assessment : Wear solely goggles.
orker exposure: Industrial use (Mixing or blending in a of preparations and articles (multistage and/or
: <= 100 %
: Low volatile liquid : 0,123 hPa
: <= 480 min : <= 240 days per year
sk management : Palm of both hands
: 480 cm <sup>2</sup>
ing workers exposure : Indoor
<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.</li> </ul>
: 90 %
yond the REACH Chemical Safety Assessment : Wear solely goggles.
orker exposure: Industrial use (Transfer of substance rging) from/to vessels/large containers at non
: <= 100 %
<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
: <= 480 min : <= 240 days per year

Dermal exposure		Both hands
Exposed skin surface assumed	:	960 cm <sup>2</sup>



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor

: Indoor

#### **Risk management measures**

Mixture/Article

Exposure routes Technical conditions and	: Inhalation : Local exhaust ventilation
measures Effectiveness (of a measure)	: 90 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

1.2.7 ES 1 - CS 7: Control of worker exposure: Industrial use (Transfer of substance

or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year		
Human factors not influenced by risk managementDermal exposure:Palm of both handsExposed skin surface assumed:480 cm²			
Other operational conditions affecting workers exposure Outdoor / Indoor : Indoor			
Risk management measures Note	: No specific measures identified.		
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.			
1.2.8 ES 1 - CS 8: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)			
Product characteristics Concentration of the Substance in	: <= 100 %		



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Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Amount used	
Storage	: <1 kg, <1 l
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	k management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affectir	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: Use as laboratory reagent
	No specific measures identified.
	ond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.

## **1.3. ES 1** Exposure estimation and reference to its source

1.3.2 ES 1 - CS 2: Worker exposure: Industrial use (Use in closed p	process, no
likelihood of exposure) (PROC1)	

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

## **1.3.3 ES 1 - CS 3:** Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07

Human health (combined for

all exposure routes)



0,08

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Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified	0,01

ECETOC TRA v2.0 worker; modified version

1.3.4 ES 1 - CS 4: Worker exposure: Industrial use (Use in closed batch process
(synthesis or formulation), Use in batch and other process (synthesis) where
opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# **1.3.5 ES 1 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)**

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

# 1.3.6 ES 1 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

oute of exposure and ty	e Exposure estimate	RCR
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of effects		
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 1.3.7 ES 1 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

## 1.3.8 ES 1 - CS 8: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37



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## 1.4. ES 1 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

# 2. ES 2: Industrial use; Industrial use of processing aids in processes and products, not becoming part of articles

## 2.1. Titles of Contributing scenarios (CS)

Enviror	nment	
	Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles)	ERC4
Worker	rs	
CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC1 PROC2
	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4
	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5
	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS9:	Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	PROC14
CS10:	Industrial use (Use as laboratory reagent)	PROC15

## 2.2. ES 2 Conditions of use affecting exposure

2.2.1 ES 2 - CS 1: Control of environmental exposure: Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles) (ERC4)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.



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#### **Product characteristics**

Concentration of the Substance in : Mixture/Article

As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed., The use is assessed to be safe.

## 2.2.2 ES 2 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use) Vapour pressure		Low volatile liquid 0,123 hPa
Frequency and duration of use		
Exposure duration	•	<= 480 min
Frequency of use	:	<= 240 days per year
Human factors not influenced by risk	k n	nanagement
Dermal exposure		Palm of one hand
Exposed skin surface assumed	:	240 cm <sup>2</sup>
Other operational conditions affectin Outdoor / Indoor		workers exposure Indoor
Risk management measures		
Technical conditions and measures	:	Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Additional good practice advice beyo Additional good practice advice		d the REACH Chemical Safety Assessment Wear solely goggles.
2.2.3 ES 2 - CS 3: Control of wor continuous process with occasio		er exposure: Industrial use (Use in closed, al controlled exposure) (PROC2)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use) Vapour pressure		Low volatile liquid 0,123 hPa

## Frequency and duration of use

Exposure duration	:	<= 480 min
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Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
Risk management measures Note	: Use in closed, continuous process with occasional controlled exposure No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where ) (PROC3, PROC4)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year

## Human factors not influenced by risk management

Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in batch and other process (synthesis) where opportunity for exposure arises
Exposed skin surface assumed	<ul> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportunity</li> </ul>

## Other operational conditions affecting workers exposure Outdoor / Indoor

<b>Risk management measures</b> Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises No specific measures identified.

: Indoor



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Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.	
	orker exposure: Industrial use (Mixing or blendin of preparations and articles (multistage and/or	g in
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by ris Dermal exposure	: Palm of both hands	
Exposed skin surface assumed		
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor	
Risk management measures		
Exposure routes	: Dermal exposure	
Personal protective measures Effectiveness (of a measure)	<ul> <li>Wear chemically resistant gloves (tested to EN374) i combination with specific activity training.</li> <li>90 %</li> </ul>	in
Effectiveness (of a measure)	. 90 %	
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.	
	orker exposure: Industrial use (Transfer of substa rging) from/to vessels/large containers at non	ance
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use		
Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	

numan factors not innuenced by	1124 11	lanagement
Dermal exposure	:	Both hands
Exposed skin surface assumed	:	960 cm <sup>2</sup>



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor

: Indoor

### **Risk management measures**

Exposure routes Technical conditions and measures	: Inhalation : Local exhaust ventilation
Effectiveness (of a measure) Personal protective measures	<ul><li>90 %</li><li>If technical exhaust or ventilation measures are not possible</li></ul>
Effectiveness (of a measure)	or insufficient, respiratory protection must be worn. : 90 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

2.2.7 ES 2 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands	
Other operational conditions affectin Outdoor / Indoor	n <b>g workers exposure</b> : Indoor	
Risk management measures Note	: No specific measures identified.	
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.	
2.2.8 ES 2 - CS 8: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)		

Product characteristics Concentration of the Substance in : <= 100 % Mixture/Article



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Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
vapour pressure	. 0,12511Fa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by r	isk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affect	ting workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Additional good practice advice b	eyond the REACH Chemical Safety Assessment
Additional good practice advice	

## 2.2.9 ES 2 - CS 9: Control of worker exposure: Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC14)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	<b>vond the REACH Chemical Safety Assessment</b> : Wear solely goggles.

2.2.10 ES 2 - CS 10: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)



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Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %	
	: Low volatile liquid : 0,123 hPa	
Amount used Storage	: <1 kg, < 1 l	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by risk Dermal exposure Exposed skin surface assumed	: Palm of both hands	
Other operational conditions affecting Outdoor / Indoor	g workers exposure : Indoor	
Risk management measures Note	: Use as laboratory reagent No specific measures iden	tified.
Additional good practice advice beyo Additional good practice advice	nd the REACH Chemical Sa : Wear solely goggles.	fety Assessment

## 2.3. ES 2 Exposure estimation and reference to its source

## 2.3.2 ES 2 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

2.3.3 ES 2 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 2.3.4 ES 2 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 2.3.5 ES 2 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

## 2.3.6 ES 2 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated



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#### facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 2.3.7 ES 2 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic		
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 2.3.8 ES 2 - CS 8: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	
Human health (combined for	ECETOC TRA v2.0 worker; modified version	0,75



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all exposure routes)	

### 2.3.9 ES 2 - CS 9: Worker exposure: Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 2.3.10 ES 2 - CS 10: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

## 2.4. ES 2 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

### 3. ES 3: Industrial use; Distribution of substance

#### 3.1. Titles of Contributing scenarios (CS)

Enviro	onment	
CS1:	Industrial use (Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7



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	processes in production of resins, rubbers, polymers, Industrial u substances in closed systems)	se of
Worke	ers	
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasiona controlled exposure)	PROC1 I PROC2
CS4:	Industrial use (Use in closed batch process (synthesis or formula Use in batch and other process (synthesis) where opportunity for exposure arises)	
CS5:		PROC8a edicated
CS6:		
CS7:	Industrial use (Use as laboratory reagent)	PROC15

### 3.2. ES 3 Conditions of use affecting exposure

3.2.1 ES 3 - CS 1: Control of environmental exposure: Industrial use (Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems) (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.

The use is assessed to be safe.

#### 3.2.2 ES 3 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

**Product characteristics** 

Concentration of the Substance in : <= 100 %Mixture/Article



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Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other operational conditions affecti Outdoor / Indoor	ing workers exposure : Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	sk management : Palm of both hands : 480 cm²
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
Risk management measures Note	: Use in closed, continuous process with occasional controlled exposure No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.

Additional good practice advice : Wear solely goggles.

3.2.4 ES 3 - CS 4: Control of worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where



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annartunitu far avnaaura ariaaa)	
opportunity for exposure arises)	(PROC3, PROC4)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Remarks Dermal exposure Exposed skin surface assumed Remarks	<ul> <li>sk management</li> <li>Palm of one hand</li> <li>240 cm<sup>2</sup></li> <li>Use in closed batch process (synthesis or formulation)</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> <li>Use in batch and other process (synthesis) where opportunit for exposure arises</li> </ul>
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	<ul> <li>Use in batch and other process (synthesis) where opportunit for exposure arises No specific measures identified.</li> </ul>
Additional good practice advice bey Additional good practice advice	<pre>/ond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>
	orker exposure: Industrial use (Transfer of substance rging) from/to vessels/large containers at non
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris	sk management



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Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other energianal conditions offection	
Other operational conditions affecting Outdoor / Indoor	
	: Indoor
Pick management measures	
Risk management measures Exposure routes	: Inhalation
	: Local exhaust ventilation
measures	
	: 90 %
· · · · · · · · · · · · · · · · · · ·	: If technical exhaust or ventilation measures are not possible
	or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

3.2.6 ES 3 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year		
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands		
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor		
Risk management measures Note	: No specific measures identified.		
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.			
3.2.7 ES 3 - CS 7: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)			

Product characteristics Concentration of the Substance in : <= 100 % Mixture/Article



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Physical Form (at time of use)	
Vapour pressure	: 0,123 hPa
Amount used	
Storage	: <1 kg, <1 l
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by risl	k management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affectin	
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: Use as laboratory reagent
	No specific measures identified.
Additional good practice advice beve	ond the REACH Chemical Safety Assessment
Additional good practice advice	

### **3.3. ES 3** Exposure estimation and reference to its source

3.3.2 ES 3 - CS 2: Worker exposure: Industrial use (Use in closed process, no
likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

### 3.3.3 ES 3 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	0,07



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- local and systemic	version)	
Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified	0,01
systemic	version)	
Human health (combined for	ECETOC TRA v2.0 worker; modified version	0,08
all exposure routes)		

# 3.3.4 ES 3 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 3.3.5 ES 3 - CS 5: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 3.3.6 ES 3 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 3.3.7 ES 3 - CS 7: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

## 3.4. ES 3 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

# 4. ES 4: Industrial use; Formulation [mixing] of preparations and/or re-packaging





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### 4.1. Titles of Contributing scenarios (CS)

Environment					
CS1:	Industrial use (Formulation of preparations)	ERC2			
Worke	Workers				
CS2:	Industrial use (Use in closed process, no likelihood of exposure)	PROC1			
CS3:	Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC2			
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4			
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5			
CS6:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a			
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9			
CS8:	Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	PROC14			
CS9:	Industrial use (Use as laboratory reagent)	PROC15			

### 4.2. ES 4 Conditions of use affecting exposure

4.2.1 ES 4 - CS 1: Control of environmental exposure: Industrial use (Formulation of preparations) (ERC2)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 4.2.2 ES 4 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Product characteristics Concentration of the Substance in : <= 100 % Mixture/Article

Physical Form (at time of use) : Low volatile liquid



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Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure.
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.
	rker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2) : <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
	. 0,120111 4
Frequency and duration of use	100 min
Exposure duration	= 480  min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: Use in closed, continuous process with occasional controlled
	exposure
	No specific measures identified.

4.2.4 ES 4 - CS 4: Control of worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)



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Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed Remarks	: 480 cm <sup>2</sup>
Remarks	: Use in batch and other process (synthesis) where opportunit
	for exposure arises
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Risk management measures Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunit
	for exposure arises
	No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
425 ES4-CS5: Control of wo	orker exposure: Industrial use (Mixing or blending in
	of preparations and articles (multistage and/or
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	: 90 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

#### 4.2.6 ES 4 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by risk	management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affectin	g workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Inhalation
Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 90 %
	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %
Additional good practice advice beyo	and the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

4.2.7 ES 4 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)



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Product characteristics		
Concentration of the Substance in	: <= 100 %	
Mixture/Article		
Physical Form (at time of use)	: Low volatile liquid	
Vapour pressure	: 0,123 hPa	
Frequency and duration of use		
Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
luman factors not influenced by ris	k management	
Dermal exposure	: Palm of both hands	
Exposed skin surface assumed		
Other operational conditions affecti	na workers exposure	
Outdoor / Indoor	: Indoor	
Risk management measures Note	: No specific measures ide	antified
Note		
Additional wood wyootion advice boy	and the DEACLI Chamical (	Safaty Assassment
Additional good practice advice bey Additional good practice advice		Safety Assessment
	: Wear solely goggles. rker exposure: Industrial	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table	: Wear solely goggles. rker exposure: Industrial	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by tablet Product characteristics	: Wear solely goggles. rker exposure: Industrial ting, compression, extru	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table	: Wear solely goggles. rker exposure: Industrial ting, compression, extru	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table Product characteristics Concentration of the Substance in Mixture/Article	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial iting, compression, extru</li> <li>: &lt;= 100 %</li> </ul>	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tablet</b> <b>Product characteristics</b> Concentration of the Substance in	: Wear solely goggles. rker exposure: Industrial ting, compression, extru	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tablet</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial industrial industrial, compression, extru</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> </ul>	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial sting, compression, extruents</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> </ul>	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial sting, compression, extruent compression, extruent compression, extruent complexity of the structure comp</li></ul>	use (Production of
Additional good practice advice <b>1.2.8 ES 4 - CS 8: Control of wo</b> <b>breparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extru</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> <li>&lt;= 480 min</li> <li>&lt;= 240 days per year</li> </ul>	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use Human factors not influenced by ris	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extru</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> <li>&lt;= 480 min</li> <li>&lt;= 240 days per year</li> <li>k management</li> </ul>	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by table Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial tring, compression, extru</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> <li>&lt;= 480 min</li> <li>&lt;= 240 days per year</li> <li>k management</li> <li>Palm of both hands</li> </ul>	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use Human factors not influenced by ris	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extru</li> <li>&lt;= 100 %</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> <li>&lt;= 480 min</li> <li>&lt;= 240 days per year</li> <li>k management</li> </ul>	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use <b>Human factors not influenced by ris</b> Dermal exposure Exposed skin surface assumed <b>Other operational conditions affecti</b>	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extruent is a second structure in the second structure is a second structure in the second structure is a second structure in the second structure is a second</li></ul>	use (Production of
Additional good practice advice <b>1.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use <b>Human factors not influenced by ris</b> Dermal exposure Exposed skin surface assumed	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extruent in the second state of the second</li></ul>	use (Production of
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use <b>Human factors not influenced by ris</b> Dermal exposure Exposed skin surface assumed <b>Other operational conditions affecti</b> Outdoor / Indoor	<ul> <li>: Wear solely goggles.</li> <li>rker exposure: Industrial iting, compression, extruent iting, compression, extruent it compression, extruent it compression, extruent iteration i</li></ul>	use (Production of
Additional good practice advice I.2.8 ES 4 - CS 8: Control of wo preparations or articles by tabled Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Other operational conditions affecti Outdoor / Indoor Risk management measures	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial ting, compression, extruent in the second state of the second</li></ul>	use (Production of sion, pelettisation) (PROC14
Additional good practice advice <b>I.2.8 ES 4 - CS 8: Control of wo</b> <b>preparations or articles by tabled</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure <b>Frequency and duration of use</b> Exposure duration Frequency of use <b>Human factors not influenced by ris</b> Dermal exposure Exposed skin surface assumed <b>Other operational conditions affecti</b> Outdoor / Indoor	<ul> <li>: Wear solely goggles.</li> <li>rker exposure: Industrial iting, compression, extruent iting, compression, extruent it compression, extruent it compression, extruent iteration i</li></ul>	use (Production of sion, pelettisation) (PROC14
Additional good practice advice Additional good practice advice Additional good practice advice Additional good practice advice Additional good practice advice advice advice by tablet Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by rist Dermal exposure Exposed skin surface assumed Other operational conditions affectit Outdoor / Indoor Risk management measures	<ul> <li>Wear solely goggles.</li> <li>rker exposure: Industrial tring, compression, extruing, e</li></ul>	use (Production of sion, pelettisation) (PROC14

4.2.9 ES 4 - CS 9: Control of worker exposure: Industrial use (Use as laboratory



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reagent) (PROC15)		
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
	: Low volatile liquid : 0,123 hPa	
Amount used Storage	: <1 kg, < 1 l	
Storage		
Frequency and duration of use		
	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by risk	management	
	: Palm of both hands	
Exposed skin surface assumed	: 240 cm <sup>2</sup>	
Other operational conditions affecting Outdoor / Indoor	<b>g workers exposure</b> : Indoor	
Risk management measures Note	: Use as laboratory reagent No specific measures iden	tified.
Additional good practice advice beyo Additional good practice advice	nd the REACH Chemical Sa : Wear solely goggles.	afety Assessment

### 4.3. ES 4 Exposure estimation and reference to its source

### 4.3.2 ES 4 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

4.3.3 ES 4 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 4.3.4 ES 4 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 4.3.5 ES 4 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

#### 4.3.6 ES 4 - CS 6: Worker exposure: Industrial use (Transfer of substance or



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### preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 4.3.7 ES 4 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 4.3.8 ES 4 - CS 8: Worker exposure: Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03



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Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 4.3.9 ES 4 - CS 9: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

## 4.4. ES 4 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

### 5. ES 5: Industrial use; Use in polymer production

### 5.1. Titles of Contributing scenarios (CS)

Environment		
CS1:	Industrial use (Industrial use of monomers for manufacture of thermoplastics)	ERC6c
Worke	rs	
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC1 PROC2
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5
CS6:	Industrial use (Calendering operations)	PROC6
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Use as laboratory reagent)	PROC15



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#### 5.2. ES 5 Conditions of use affecting exposure

### 5.2.1 ES 5 - CS 1: Control of environmental exposure: Industrial use (Industrial use of monomers for manufacture of thermoplastics) (ERC6c)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 5.2.2 ES 5 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other operational conditions affecting	ng workers exposure
Outdoor / Indoor	: Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

5.2.3 ES 5 - CS 3: Control of worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)



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Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
Risk management measures Note	: Use in closed, continuous process with occasional controlled exposure No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where ) (PROC3, PROC4)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Remarks Dermal exposure Exposed skin surface assumed Remarks	<ul> <li>sk management</li> <li>Palm of one hand</li> <li>240 cm<sup>2</sup></li> <li>Use in closed batch process (synthesis or formulation)</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> <li>Use in batch and other process (synthesis) where opportunity for exposure arises</li> </ul>
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor



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<b>Risk management measures</b> Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
	-1
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	ing workers exposure : Indoor
Pick management measures	
Risk management measures Exposure routes	: Dermal exposure
Personal protective measures	<ul> <li>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.</li> </ul>
Effectiveness (of a measure)	: 90 %
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
5.2.6 ES 5 - CS 6: Control of wo operations) (PROC6)	orker exposure: Industrial use (Calendering
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %

Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa

Frequency and duration of use



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Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
r requeriey of use	
Human factors not influenced by ris	-
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
·	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice bey	
or preparation (charging/dischar dedicated facilities) (PROC8a)	ging) from/to vessels/large containers at non
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in	
dedicated facilities) (PROC8a) Product characteristics	
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in	
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use)	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
dedicated facilities) (PROC8a) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ris	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: k management</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris Dermal exposure</li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affectin <ul> <li>Outdoor / Indoor</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: K management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affecting <ul> <li>Outdoor / Indoor</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affectin <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> <li>: Inhalation</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affection <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> <li>Technical conditions and</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affectin <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> <li>Technical conditions and measures</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: = 240 days per year</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> <li>: Inhalation</li> <li>: Local exhaust ventilation</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affectin <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> <li>Technical conditions and</li> <li>measures</li> <li>Effectiveness (of a measure)</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: K management</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> <li>: Inhalation</li> <li>: Local exhaust ventilation</li> <li>: 90 %</li> </ul>
<ul> <li>dedicated facilities) (PROC8a)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affectin <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> <li>Technical conditions and measures</li> </ul> </li> </ul>	<ul> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: = 240 days per year</li> <li>: Both hands</li> <li>: 960 cm<sup>2</sup></li> <li>ng workers exposure</li> <li>: Indoor</li> <li>: Inhalation</li> <li>: Local exhaust ventilation</li> </ul>

### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.



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5.2.8 ES 5 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
5.2.9 ES 5 - CS 9: Control of wor reagent) (PROC15)	ker exposure: Industrial use (Use as laboratory
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Mixture/Article	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Physical Form (at time of use)	
Physical Form (at time of use) Vapour pressure Amount used	: 0,123 hPa

Other operational conditions affecting workers exposure



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Outdoor / Indoor	: Indoor
Risk management measures Note	: Use as laboratory reagent No specific measures identified.
Additional good practice advice beyo Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

### 5.3. ES 5 Exposure estimation and reference to its source

### 5.3.2 ES 5 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

### 5.3.3 ES 5 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 5.3.4 ES 5 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or	0,22



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	formulation))	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 5.3.5 ES 5 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

#### 5.3.6 ES 5 - CS 6: Worker exposure: Industrial use (Calendering operations) (PROC6)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

# 5.3.7 ES 5 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	0,07
<ul> <li>local and systemic</li> </ul>	version)	

all exposure routes)



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Worker - dermal, long-term -	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker;	0,13
systemic	modified version)	
Human health (combined for	ECETOC TRA v2.0 worker; modified version	0,20

# 5.3.8 ES 5 - CS 8: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 5.3.9 ES 5 - CS 9: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

## 5.4. ES 5 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario



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# 6. ES 6: Industrial use; Paints, pastels, pigment powders, Coatings

### 6.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles)	ERC4
Worke	rs	
CS2:	Industrial use (Use in closed process, no likelihood of exposure)	PROC1
CS3:	Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC2
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5
CS6:	Industrial use (Spraying in industrial settings and applications)	PROC7
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	PROC8b
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Use as laboratory reagent)	PROC15

### 6.2. ES 6 Conditions of use affecting exposure

6.2.1 ES 6 - CS 1: Control of environmental exposure: Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles) (ERC4)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.

The use is assessed to be safe.



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### 6.2.2 ES 6 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affect	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure.
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
continuous process with occasi	
	onal controlled exposure) (PROC2)
continuous process with occasi Product characteristics Concentration of the Substance in Mixture/Article	onal controlled exposure) (PROC2) : <= 100 %
continuous process with occasi Product characteristics Concentration of the Substance in	onal controlled exposure) (PROC2)
continuous process with occasi Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>onal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use</li> </ul>	onal controlled exposure) (PROC2) : <= 100 % : Low volatile liquid : 0,123 hPa
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use) Vapour pressure</li> </ul> </li> <li>Frequency and duration of use Exposure duration</li> </ul>	<ul> <li>onal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use</li> </ul>	onal controlled exposure) (PROC2) : <= 100 % : Low volatile liquid : 0,123 hPa
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration Frequency of use</li> <li>Human factors not influenced by rist</li> </ul> </li> </ul>	<ul> <li>conal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rist Dermal exposure</li> </ul>	<ul> <li>onal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration Frequency of use</li> <li>Human factors not influenced by rist</li> </ul> </li> </ul>	<ul> <li>conal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rist Dermal exposure</li> </ul>	<ul> <li>i controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rise <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affection</li> <li>Outdoor / Indoor</li> </ul>	<ul> <li>onal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> </ul>
<ul> <li>continuous process with occasi</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use) Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rise         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<ul> <li>onal controlled exposure) (PROC2)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> </ul>



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	exposure
	No specific measures identified.
Additional good practice advice bey Additional good practice advice	<b>vond the REACH Chemical Safety Assessment</b> : Wear solely goggles.
	rker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where (PROC3, PROC4)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed Remarks	<ul> <li>480 cm<sup>2</sup></li> <li>Use in batch and other process (synthesis) where opportunity</li> </ul>
Komuno	for exposure arises
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	<ul> <li>Use in batch and other process (synthesis) where opportunity for exposure arises No specific measures identified.</li> </ul>
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.

# 6.2.5 ES 6 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Product characteristics Concentration of the Substance in : <= 100 % Mixture/Article



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Physical Form (at time of use)	
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by	risk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	
Other operational conditions affe	cting workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with specific activity training.

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

### 6.2.6 ES 6 - CS 6: Control of worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Amount used Amounts used	: 0,6 L/min
Frequency and duration of use Exposure duration Frequency of use	: 360 min : <= 5 days per week
Human factors not influenced by ris	k management : Whole body
Dermal exposure Other operational conditions affectir	: Whole body ng workers exposure
Dermal exposure	: Whole body
Dermal exposure Other operational conditions affectir Outdoor / Indoor	: Whole body ng workers exposure : Indoor



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	worker.	
Personal protective measures	Wear chemically resistant gloves (tested to EN374) combination with 'basic' employee training.	in
Effectiveness (of a measure)	90 %	
Personal protective measures	Wear suitable working clothes. Wear suitable coveralls to prevent exposure to the s	skin.
Effectiveness (of a measure)	80 %	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that the distance from worker to task is gream.	ter than 1.
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure that direction of application is only horizonta downward.	l or
Organisational measures to prevent /limit releases, dispersion and exposure	Regular cleaning of work area	
Organisational measures to prevent /limit releases, dispersion and exposure	Regular cleaning of equipment	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure regular inspection, cleaning and maintenance equipment and machines.	e of

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

# 6.2.7 ES 6 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use) Vapour pressure		Low volatile liquid 0,123 hPa
Frequency and duration of use		
Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year
Human factors not influenced by ris	k n	nanagement
Dermal exposure	:	Both hands

Demai exposure	•	Doin nan
Exposed skin surface assumed	:	960 cm <sup>2</sup>

#### Other operational conditions affecting workers exposure



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Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Inhalation exposure
Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 90 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %
	ond the REACH Chemical Safety Assessment : Wear solely goggles.

# 6.2.8 ES 6 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affectin Outdoor / Indoor	<b>g workers exposure</b> : Indoor
Risk management measures	
Note	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities No specific measures identified.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
6.2.9 ES 6 - CS 9: Control of wor brushing) (PROC10)	ker exposure: Industrial use (Roller application or
Product characteristics Concentration of the Substance in	: <= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid



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Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
0.2.10 = 50 - 0.5 10. Control of	
	13)
Product characteristics Concentration of the Substance in	
Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ris	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rise</li> <li>Dermal exposure</li> </ul>	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rise</li> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul>	<ul> <li>13)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by rise</li> <li>Dermal exposure <ul> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affection</li> <li>Outdoor / Indoor</li> </ul>	<ul> <li>i &lt;= 100 %</li> <li>i Low volatile liquid</li> <li>i 0,123 hPa</li> <li>i &lt;= 480 min</li> <li>i &lt;= 240 days per year</li> <li>isk management</li> <li>i Palm of both hands</li> <li>i 480 cm<sup>2</sup></li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affecti <ul> <li>Outdoor / Indoor</li> </ul> </li> </ul>	<ul> <li>i &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> <li>: Indoor</li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affecti <ul> <li>Outdoor / Indoor</li> </ul> </li> <li>Risk management measures <ul> <li>Exposure routes</li> </ul></li></ul>	<ul> <li>i &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> <li>: Indoor</li> <li>: Dermal exposure</li> </ul>
<ul> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affecti <ul> <li>Outdoor / Indoor</li> </ul> </li> </ul>	<ul> <li>i &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> <li>: Indoor</li> </ul>

- Additional good practice advice : Wear solely goggles.



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### 6.2.11 ES 6 - CS 11: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Amount used Storage	: < 1 kg, < 1 l
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	: Use as laboratory reagent
Note	No specific measures identified.
Additional good practice advice bey	<b>cond the REACH Chemical Safety Assessment</b>
Additional good practice advice	: Wear solely goggles.

#### 6.3. ES 6 Exposure estimation and reference to its source

### 6.3.2 ES 6 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

#### 6.3.3 ES 6 - CS 3: Worker exposure: Industrial use (Use in closed, continuous



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#### process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 6.3.4 ES 6 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 6.3.5 ES 6 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38



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### 6.3.6 ES 6 - CS 6: Worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
Human health (combined for all exposure routes)	Not applicable	0,80

# 6.3.7 ES 6 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 6.3.8 ES 6 - CS 8: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,43

### 6.3.9 ES 6 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03



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Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,77

### 6.3.10 ES 6 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 6.3.11 ES 6 - CS 11: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

## 6.4. ES 6 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

### 7. ES 7: Professional use; Paints, pastels, pigment powders, Coatings, Adhesives, sealants, Foaming, Use in polymer processing

#### 7.1. Titles of Contributing scenarios (CS)

Environment

CS1: Professional use (Wide dispersive indoor use of processing aids in open ERC8a, ERC8c, systems, Wide dispersive indoor use resulting in inclusion into or onto a ERC8d, ERC8f



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	matrix, Wide dispersive outdoor use of processing aids in open s Wide dispersive outdoor use resulting in inclusion into or onto a	
Worke	rs	
CS2:	Professional use (Use in closed process, no likelihood of exposu in closed, continuous process with occasional controlled exposu in closed batch process (synthesis or formulation))	
CS3:	Professional use (Use in batch and other process (synthesis) who opportunity for exposure arises, Mixing or blending in batch proc for formulation of preparations and articles (multistage and/or sig contact))	cesses
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non de facilities)	PROC8a edicated
CS5:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedica facilities, Transfer of substance or preparation into small container (dedicated filling line, including weighing))	
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Spraying outside industrial settings and/or applications)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring, Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	PROC13, PROC14
CS9:	Professional use (Use as laboratory reagent)	PROC15
CS10:	Professional use (Hand-mixing with intimate contact and only PF available)	PE PROC19

### 7.2. ES 7 Conditions of use affecting exposure

7.2.1 ES 7 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive outdoor use resulting in inclusion into or onto a matrix) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.

The use is assessed to be safe.

7.2.2 ES 7 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with



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	Use in closed batch process (synthesis or
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Remarks Dermal exposure Exposed skin surface assumed Remarks	<ul> <li>sk management</li> <li>Palm of one hand</li> <li>240 cm<sup>2</sup></li> <li>Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> <li>Use in closed, continuous process with occasional controlled exposure</li> </ul>
Other operational conditions affect Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	: Use in closed, continuous process with occasional controlled exposure
Technical conditions and measures	: Use in closed batch process (synthesis or formulation) With occasional controlled exposure
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
7.2.3 ES 7 - CS 3: Control of wo	orker exposure: Professional use (Use in batch and

7.2.3 ES 7 - CS 3: Control of worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC4, PROC5)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa

Frequency and duration of use



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Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: No specific measures identified.
	ond the REACH Chemical Safety Assessment
substance or preparation (charg	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at
7.2.4 ES 7 - CS 4: Control of wo	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charg non dedicated facilities) (PROC8 Product characteristics	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charg non dedicated facilities) (PROC8	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charg non dedicated facilities) (PROC8 Product characteristics Concentration of the Substance in Mixture/Article	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a) : <= 100 %
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charg non dedicated facilities) (PROC8 Product characteristics Concentration of the Substance in	rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8 Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8 Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration	<ul> <li>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at ia)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> </ul>
7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8 Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
<ul> <li>7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ris</li> </ul>	<pre>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a) : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year k management</pre>
<ul> <li>7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ris     Dermal exposure</li> </ul>	<pre>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a) : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year k management : Both hands</pre>
<ul> <li>7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ris</li> </ul>	<pre>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a) : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year k management : Both hands</pre>
<ul> <li>7.2.4 ES 7 - CS 4: Control of wo substance or preparation (charginon dedicated facilities) (PROC8</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ris     Dermal exposure</li> </ul>	<pre>rker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a) : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year k management : Both hands : 960 cm<sup>2</sup></pre>

Risk management me	easures
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Exposure routes	: Inhalation
Technical conditions and	: Local exhaust ventilation
measures	
Effectiveness (of a measure)	: 80 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

7.2.5 ES 7 - CS 5: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at



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dedicated facilities, Transfer of su (dedicated filling line, including we	bstance or preparation into small containers
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	: Low volatile liquid : 0,123 hPa
•	: <= 480 min : <= 240 days per year
Human factors not influenced by risk	
· · · · · · · · · · · · · · · · · · ·	: Palm of both hands : 480 cm <sup>2</sup>
Exposed skin surface assumed	. 480 CIII-
Other operational conditions affecting Outdoor / Indoor	<b>g workers exposure</b> : Indoor
Risk management measures Note	: No specific measures identified.
	nd the REACH Chemical Safety Assessment : Wear solely goggles.
7.2.6 ES 7 - CS 6: Control of work brushing) (PROC10)	ker exposure: Professional use (Roller application or
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	: Low volatile liquid : 0,123 hPa
	: <= 480 min : <= 240 days per year
	management : Both hands : 960 cm <sup>2</sup>
Other operational conditions affecting Outdoor / Indoor	<b>g workers exposure</b> : Indoor
Risk management measures Exposure routes Personal protective measures	<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> </ul>



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Effectiveness (of a measure)	: 90 %
Exposure routes Technical conditions and	<ul><li>Inhalation exposure</li><li>Local exhaust ventilation</li></ul>
measures Effectiveness (of a measure) Personal protective measures	<ul> <li>80 %</li> <li>If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.</li> </ul>

#### Additional good practice advice beyond the REACH Chemical Safety Assessment

: 80 %

Additional good practice advice : Wear solely goggles.

Effectiveness (of a measure)

#### 7.2.7 ES 7 - CS 7: Control of worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use) Vapour pressure		Low volatile liquid 0,123 hPa
Amount used Amounts used	:	0,05 L/min
Frequency and duration of use Exposure duration Frequency of use	-	150 min <= 5 days per week
Human factors not influenced by ris Dermal exposure		nanagement Whole body
Other operational conditions affecti Outdoor / Indoor Room size	:	workers exposure Indoor <= 1000 m3
<b>Risk management measures</b> Personal protective measures Effectiveness (of a measure)		Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. 90 %
Personal protective measures Effectiveness (of a measure)		Wear suitable working clothes. Wear suitable coveralls to prevent exposure to the skin. 80 %
Personal protective measures Effectiveness (of a measure)		Wear a respirator conforming to EN140 with type A filter or better. 40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.



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Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure Note	<ul><li>Ensure that the direction of airflow is clearly away from the worker.</li><li>Not applicable</li></ul>
Organisational measures to prevent /limit releases, dispersion and exposure	<ul> <li>Provide enhanced general ventilation by mechanical means.</li> </ul>
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

## 7.2.8 ES 7 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring, Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC13, PROC14)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use	: <= 480 min		
Exposure duration Frequency of use	: <= 400 mm : <= 240 days per year		
Human factors not influenced by risk management Dermal exposure : Palm of both hands			

Exposed skin surface assumed	: 480	cm²

Other operational conditions affecting workers exposure



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Outdoor / Indoor	: Indoor
Risk management measures Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) Note	<ul><li>90 %</li><li>Treatment of articles by dipping and pouring</li></ul>
Additional good practice advice beyon Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
7.2.9 ES 7 - CS 9: Control of wor reagent) (PROC15)	ker exposure: Professional use (Use as laboratory
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Amount used Storage	: < 1 kg, < 1 l
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by risl Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: Use as laboratory reagent No specific measures identified.
Additional good practice advice beyon Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
7.2.10 ES 7 - CS 10: Control of w intimate contact and only PPE av	vorker exposure: Professional use (Hand-mixing with ailable) (PROC19)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa



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	· · · ·		
Frequency and duration of use			
Exposure duration	: < 15 min		
Frequency of use	: <= 240 days per year		
Human factors not influenced by ris	k management		
Dermal exposure	: Both hands and main part of the arms		
Exposed skin surface assumed	: 1980 cm <sup>2</sup>		
Other exercises localities offective			
Other operational conditions affectin	•		
Outdoor / Indoor	: Indoor		
Risk management measures			
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in		
·	combination with 'basic' employee training.		
Effectiveness (of a measure)	: 90 %		
Additional good practice advice beyond the REACH Chemical Safety Assessment			
Additional good practice advice	: Wear solely goggles.		

### 7.3. ES 7 Exposure estimation and reference to its source

# 7.3.2 ES 7 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term -	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified	0,003



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systemic	version, Use in closed batch process (synthesis or		

systemic	version, Use in closed batch process (synthesis or	
	formulation))	
Human health (combined for	ECETOC TRA v2.0 worker; modified version, Use in	0,23
all exposure routes)	closed batch process (synthesis or formulation)	

# 7.3.3 ES 7 - CS 3: Worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC4, PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0,75

## 7.3.4 ES 7 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

#### 7.3.5 ES 7 - CS 5: Worker exposure: Professional use (Transfer of substance or



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## preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,80

### 7.3.6 ES 7 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 7.3.7 ES 7 - CS 7: Worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic		
Human health (combined for	Not applicable	0,91



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all exposure routes)	

## 7.3.8 ES 7 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring, Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC13, PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring	0,75
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	0,74
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Production of preparations or articles by tabletting, compression, extrusion, pelettisation	0,77

### 7.3.9 ES 7 - CS 9: Worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

### 7.3.10 ES 7 - CS 10: Worker exposure: Professional use (Hand-mixing with intimate contact and only PPE available) (PROC19)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	6,47 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,18
Worker - dermal, long-term - systemic	14,14 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,31



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## 7.4. ES 7 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

## 8. ES 8: Consumer use; Coatings and paints, thinners, paint removers, Surface treatment

### 8.1. Titles of Contributing scenarios (CS)

Coatings and paints, thinners, paint removers (PC9a)			
Non-metal surface treatment products (PC15)			
Ink an	d toners (PC18)		
Polish	es and wax blends (PC31)		
Lubric	ants, greases, release products (PC24)		
Textile dyes, finishing and impregnating products: including bleaches and other processing aids (PC34)			
Enviro	nment		
CS1:	Consumer use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive outdoor use resulting in inclusion into or onto a matrix)	ERC8a, ERC8c, ERC8d, ERC8f	
Consu	imer		
CS2:	Consumer use (Coatings and paints, thinners, paint removers, Non- metal surface treatment products)	PC9a, PC15	
CS3: Consumer use (Coatings and paints, thinners, paint removers, Non- PC9a, PC15 metal surface treatment products)			
CS4:	Consumer use (Ink and toners)	PC18	
CS5:	Consumer use (Ink and toners)	PC18	
CS6:	Consumer use (Polishes and wax blends)	PC31	

#### 8.2. ES 8 Conditions of use affecting exposure

8.2.1 ES 8 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive outdoor use resulting in inclusion into or onto a matrix) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.



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The use is assessed to be safe.

### 8.2.2 ES 8 - CS 2: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Remarks	:	Waterborne wall paint Rolling, Brushing No spraying
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	:	<= 5 %
Molecular weight Physical Form (at time of use) Vapour pressure	:	45 g/mol Liquid 0,123 hPa
Amount used Amounts used	:	1,25 kg/day
Frequency and duration of use Application duration Frequency of use Remarks Exposure duration	:	120 min 1 days per year Type of activity or process, light work 132 min
Human factors not influenced by ris Dermal exposure		nanagement Hands and forearms
Exposed skin surface assumed		1900 cm <sup>2</sup>
Dermal exposure		0,00003 kg/min
Other given operational conditions	affe	ecting consumers exposure
Outdoor / Indoor	:	Indoor
Room size		20 m3
Temperature		25 °C
Ventilation rate per hour	:	0,6
Mass transfer rate	÷	0,331 m/min
Release area		10 m2
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene) Consumer Measures : No specific measures identified.		
CONSUMER MEASURES	•	No specific measures identified.

8.2.3 ES 8 - CS 3: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)



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Remarks	: Spraying
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 5 %
Physical Form (at time of use)	: Liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,0198 kg/min
Frequency and duration of use	
Application duration	: 15 min
Frequency of use	: 2 days per year
Remarks	: Type of activity or process, light work
Exposure duration	: 15 min
Human factors not influenced by ris	k management
Dermal exposure	: Hands and forearms
Exposed skin surface assumed	: 1900 cm <sup>2</sup>
Dermal exposure	: 0,0001 kg/min
Other given operational conditions a	affecting consumers exposure
Outdoor / Indoor	: Indoor
Room size	: 34 m3
Temperature	: 25 °C
Ventilation rate per hour	: 1,5
Room height	: 2,25 m
Weight percent	: 30 %
Remarks	: Non-Volatile
Density	: 1,5 g/cm3
Remarks	: Non-Volatile
Airborne fraction	: 100 %
Remarks	: Non-Volatile
Non-respirable uptake fraction	: 1
Inhalation cut-off diameter	: 0,015 mm
Conditions and measures related to personal protection and hygiene)	protection of consumer (e.g. behavioural advice,
Consumer Measures	: Ensure spraying away from persons.
8.2.4 ES 8 - CS 4: Control of cor (PC18)	nsumer exposure: Consumer use (Ink and toners)

Product characteristics Concentration of the Substance in : <= 5 % Mixture/Article



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Substance key: SXR024717	Revision Date: 02.02.2016
Version : 5 - 2 / EU	Date of printing : 18.12.2017
Molecular weight Physical Form (at time of use) Vapour pressure	: 22 g/mol : Liquid : 0,123 hPa
Amount used Amount per use	: 0,05 kg
Frequency and duration of use Application duration Frequency of use Remarks Exposure duration	<ul> <li>0,3 min</li> <li>104 days per year</li> <li>Type of activity or process, light work</li> <li>0,75 min</li> </ul>
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other given operational conditions a Outdoor / Indoor Temperature Ventilation rate per hour	affecting consumers exposure : Indoor : 25 °C : 0,5
Mass transfer rate Release area	: 0,331 m/min : 20 cm <sup>2</sup>
	protection of consumer (e.g. behavioural advice,
personal protection and hygiene) Consumer Measures	: No specific measures identified.
8.2.5 ES 8 - CS 5: Control of cor (PC18)	nsumer exposure: Consumer use (Ink and toners)
Remarks	: Printing process
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 5 %
Physical Form (at time of use) Vapour pressure	: Liquid : 0,123 hPa
Amount used	: 0,016 kg/day
Frequency and duration of use Exposure duration Frequency of use Remarks	: 600 min : 365 days per year : Type of activity or process, light work
Other given operational conditions a Outdoor / Indoor Room size Temperature	affecting consumers exposure : Indoor : 25 m3 : 25 °C



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Ventilation rate per hour	: 0,6
Conditions and measures related to personal protection and hygiene)	protection of consumer (e.g. behavioural advice,
Consumer Measures	: No specific measures identified.
8.2.6 ES 8 - CS 6: Control of cor blends) (PC31)	nsumer exposure: Consumer use (Polishes and wax
Remarks	: No spraying
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 2,5 %
Molecular weight Physical Form (at time of use)	: 272 g/mol : Liquid
Vapour pressure	: 0,123 hPa
Amount used	
	: 0,55 kg/day
Frequency and duration of use	
Application duration	: 900 min
Frequency of use	: 1 days per year
Release duration	: 120 min
Exposure duration	: 240 min
Human factors not influenced by ris	
Dermal exposure	: Hand, or, Palm of both hands
Exposed skin surface assumed	: 430 cm <sup>2</sup>
Dermal exposure	: 0,00003 kg/min
Other given operational conditions a	•
Outdoor / Indoor	: Indoor
Room size	: 58 m3
Temperature	: 25 °C
Ventilation rate per hour	: 0,5
Mass transfer rate	: 4740 m/min
Release area	: 22 m2
Conditions and measures related to personal protection and hygiene)	protection of consumer (e.g. behavioural advice,
Consumer Measures	: No specific measures identified.

### 8.3. ES 8 Exposure estimation and reference to its source



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### 8.3.2 ES 8 - CS 2: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,72 mg/m³ (ConsExpo v4.1)	0,10
Consumer - dermal, long-term - systemic	2,77 mg/kg bw/day (ConsExpo v4.1)	0,05
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,15

### 8.3.3 ES 8 - CS 3: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,26 mg/m³ (ConsExpo v4.1)	0,04
Consumer - dermal, long-term - systemic	1,15 mg/kg bw/day (ConsExpo v4.1)	0,02
Consumer - oral, long-term - systemic	0,13 mg/kg bw/day (ConsExpo v4.1, Risk management measures are based on qualitative risk characterisation.)	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,06

#### 8.3.4 ES 8 - CS 4: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer - dermal, long-term - systemic	0,008 mg/kg bw/day (ConsExpo v4.1)	0,0002

#### 8.3.5 ES 8 - CS 5: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	1,29 mg/m <sup>3</sup> (ConsExpo v4.1)	0,18

### 8.3.6 ES 8 - CS 6: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)



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Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	3,93 mg/m <sup>3</sup> (ConsExpo v4.1)	0,56
Consumer - dermal, long-term - systemic	2,12 mg/kg bw/day (ConsExpo v4.1)	0,04
Human health (combined for all exposure routes)	ConsExpo v4.1	0,60

## 8.4. ES 8 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

### 9. ES 9: Industrial use; Use in cleaning agents

### 9.1. Titles of Contributing scenarios (CS)

Enviro	nmont	
	nment	
CS1:	···· · · · · · · · · · · · · · · · · ·	ERC4
	products, not becoming part of articles)	
Worke	rs	
CS2:	Industrial use (Use in closed process, no likelihood of exposure)	PROC1
CS3:	Industrial use (Use in closed, continuous process with occasional	PROC2
	controlled exposure)	
CS4:		PROC3, PROC4
	Use in batch and other process (synthesis) where opportunity for	,
	exposure arises)	
CS5:		PROC7
CS6:	Industrial use (Transfer of substance or preparation	PROC8a
000.	(charging/discharging) from/to vessels/large containers at non dedicated	1 Recou
	facilities)	
007		DDOCah
CS7:	Industrial use (Transfer of substance or preparation	PROC8b
	(charging/discharging) from/to vessels/large containers at dedicated	
	facilities)	
CS8:	Industrial use (Roller application or brushing)	PROC10
CS9:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

#### 9.2. ES 9 Conditions of use affecting exposure

9.2.1 ES 9 - CS 1: Control of environmental exposure: Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles) (ERC4)



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Remarks	: As no environmental hazard was identified no environmental- related exposure assessment and risk characterization was performed. The use is assessed to be safe.
Concentration of the Substance in Mixture/Article	: <= 100 %

### 9.2.2 ES 9 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

<b>Product characteristics</b> Concentration of the Substance in : Mixture/Article	<= 100 %	
,	Low volatile liquid 0,123 hPa	
	<= 480 min	
	<= 240 days per year	
Human factors not influenced by risk	management	
Dermal exposure : Exposed skin surface assumed :	Palm of one hand 240 cm <sup>2</sup>	
Other operational conditions affecting Outdoor / Indoor	workers exposure Indoor	
<b>Risk management measures</b> Technical conditions and : measures	Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.	
Additional good practice advice beyon Additional good practice advice :	nd the REACH Chemical Safety Assessment Wear solely goggles.	
9.2.3 ES 9 - CS 3: Control of worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)		
<b>Product characteristics</b> Concentration of the Substance in : Mixture/Article	<= 100 %	

Physical Form (at time of use)		Low volatile liquid
Vapour pressure	:	0,123 hPa



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Frequency and duration of use	
Frequency and duration of use Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Pick management massures	
Risk management measures Note	: Use in closed, continuous process with occasional controlle
	exposure
	No specific measures identified.
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice bey	
opportunity for exposure arises) Product characteristics Concentration of the Substance in	
opportunity for exposure arises) Product characteristics Concentration of the Substance in Mixture/Article	(PROC3, PROC4) ∴ <= 100 %
opportunity for exposure arises) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use)	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
opportunity for exposure arises) Product characteristics Concentration of the Substance in Mixture/Article	(PROC3, PROC4) ∴ <= 100 %
opportunity for exposure arises) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
opportunity for exposure arises) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use</li> </ul>	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> </ul>	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris Dermal exposure</li> </ul>	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed Remarks</li> </ul> </li> </ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed             <ul> <li>Remarks</li> <li>Dermal exposure</li> </ul> </li> </ul></li></ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: K management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed             <ul> <li>Remarks</li> <li>Dermal exposure</li> </ul> </li> </ul></li></ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opporture</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use) Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> </ul> </li> </ul>	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: K management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportune for exposure arises</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> </ul> </li> <li>Other operational conditions affecti</li> </ul>	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>ik management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportune for exposure arises</li> </ul>
<ul> <li>opportunity for exposure arises)</li> <li>Product characteristics         <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use)</li> <li>Vapour pressure</li> </ul> </li> <li>Frequency and duration of use         <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ris         <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> <li>Remarks</li> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<ul> <li>(PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: K management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportur for exposure arises</li> </ul>
opportunity for exposure arises)         Product characteristics         Concentration of the Substance in         Mixture/Article         Physical Form (at time of use)         Vapour pressure         Frequency and duration of use         Exposure duration         Frequency of use         Human factors not influenced by ris         Dermal exposure         Exposed skin surface assumed         Remarks         Other operational conditions affecti	<ul> <li>i (PROC3, PROC4)</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>ik management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportur for exposure arises</li> </ul>

Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises



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	No specific measures identified.
Additional good practice advice bey Additional good practice advice	rond the REACH Chemical Safety Assessment : Wear solely goggles.
9.2.5 ES 9 - CS 5: Control of work settings and applications) (PROC	rker exposure: Industrial use (Spraying in industrial C7)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Amount used Amounts used	: 0,6 L/min
Frequency and duration of use Exposure duration Frequency of use	: 360 min : <= 5 days per week
Human factors not influenced by ris Dermal exposure	k management : Whole body
Other operational conditions affection Outdoor / Indoor	ng workers exposure : Indoor
Room size	: > 1000 m3
Risk management measures Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure) Note	<ul> <li>50 %</li> <li>Ensure that the direction of airflow is clearly away from the worker.</li> </ul>
Personal protective measures Effectiveness (of a measure)	<ul> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>
Personal protective measures	: Wear suitable working clothes.
Effectiveness (of a measure)	Wear suitable coveralls to prevent exposure to the skin. 80 %
Organisational measures to prevent /limit releases, dispersion and exposure	<ul> <li>Burger : Ensure that the distance from worker to task is greater than 1 m.</li> </ul>
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direction of application is only horizontal or downward.
Organisational measures to	: Regular cleaning of work area



prevent /limit releases, dispersion and exposure Organisational measures to prevent /limit releases, dispersion and exposure Additional good practice advice beyo Additional good practice advice 0.2.6 ES 9 - CS 6: Control of work	Revision Date: 02.02.2016         Date of printing : 18.12.2017         : Regular cleaning of equipment         : Ensure regular inspection, cleaning and maintenance of equipment and machines.         ond the REACH Chemical Safety Assessment         : Wear solely goggles.         ker exposure: Industrial use (Transfer of substance ing) from/to vessels/large containers at non
prevent /limit releases, dispersion and exposure Organisational measures to prevent /limit releases, dispersion and exposure Organisational measures to prevent /limit releases, dispersion and exposure Additional good practice advice beyo Additional good practice advice 0.2.6 ES 9 - CS 6: Control of work	<ul> <li>Regular cleaning of equipment</li> <li>Ensure regular inspection, cleaning and maintenance of equipment and machines.</li> <li>Ind the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> <li>ker exposure: Industrial use (Transfer of substance)</li> </ul>
and exposure Organisational measures to prevent /limit releases, dispersion and exposure Organisational measures to prevent /limit releases, dispersion and exposure Additional good practice advice beyo Additional good practice advice	<ul> <li>Ensure regular inspection, cleaning and maintenance of equipment and machines.</li> <li>Ind the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> <li>ker exposure: Industrial use (Transfer of substance)</li> </ul>
prevent /limit releases, dispersion and exposure Organisational measures to prevent /limit releases, dispersion and exposure Additional good practice advice beyo Additional good practice advice 0.2.6 ES 9 - CS 6: Control of work	<ul> <li>Ensure regular inspection, cleaning and maintenance of equipment and machines.</li> <li>Ind the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> <li>ker exposure: Industrial use (Transfer of substance)</li> </ul>
prevent /limit releases, dispersion and exposure Additional good practice advice beyo Additional good practice advice 0.2.6 ES 9 - CS 6: Control of work	equipment and machines. ond the REACH Chemical Safety Assessment : Wear solely goggles. ker exposure: Industrial use (Transfer of substance
Additional good practice advice	: Wear solely goggles. ker exposure: Industrial use (Transfer of substance
0.2.6 ES 9 - CS 6: Control of work	ker exposure: Industrial use (Transfer of substance
ledicated facilities) (PROC8a)	
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
Frequency and duration of use	
	: <= 480 min
	: <= 240 days per year
luman factors not influenced by risk	management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecting	n workers exposure
	: Indoor
Risk management measures	
Exposure routes	: Inhalation exposure
	: Local exhaust ventilation
measures	
	: 90 %
	: If technical exhaust or ventilation measures are not possibl or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %
Additional good practice advice bevo	and the REACH Chemical Safety Assessment

9.2.7 ES 9 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)



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Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure	: Palm of both hands
Exposed skin surface assumed	
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities No specific measures identified.
Additional good practice advice bey Additional good practice advice	rond the REACH Chemical Safety Assessment : Wear solely goggles.
9.2.8 ES 9 - CS 8: Control of wo brushing) (PROC10)	rker exposure: Industrial use (Roller application or
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	k management : Both hands : 960 cm <sup>2</sup>
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Exposure routes Personal protective measures	<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> </ul>
Effectiveness (of a measure)	: 90 %



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#### Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

### 9.2.9 ES 9 - CS 9: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affection	ng workers exposure
Outdoor / Indoor	: Indoor
<b>Risk management measures</b> Exposure routes Personal protective measures Effectiveness (of a measure)	<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

### 9.3. ES 9 Exposure estimation and reference to its source

### 9.3.2 ES 9 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004



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### 9.3.3 ES 9 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

## 9.3.4 ES 9 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

### 9.3.5 ES 9 - CS 5: Worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
Human health (combined for all exposure routes)	Not applicable	0,80



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## 9.3.6 ES 9 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

## 9.3.7 ES 9 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,43

### 9.3.8 ES 9 - CS 8: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,77

### 9.3.9 ES 9 - CS 9: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74



0,75

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Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01

ECETOC TRA v2.0 worker; modified version

## 9.4. ES 9 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

Human health (combined for

all exposure routes)

### **10. ES 10: Professional use; Use in cleaning agents**

### 10.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems)	ERC8a, ERC8d
Worke	rs	
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation))	PROC1, PROC2, PROC3
CS3:	Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS5:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	PROC8b
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Spraying outside industrial settings and/or applications)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13

#### 10.2. ES 10 Conditions of use affecting exposure

10.2.1 ES 10 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems) (ERC8a, ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.



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The use is assessed to be safe.

# 10.2.2 ES 10 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	<pre>c management</pre>
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in closed, continuous process with occasional controlled exposure
Other operational conditions affection	g workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure.
Technical conditions and	: Use in closed, continuous process with occasional controlled
measures	exposure
Technical conditions and measures	: Use in closed batch process (synthesis or formulation) With occasional controlled exposure
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

#### 10.2.3 ES 10 - CS 3: Control of worker exposure: Professional use (Use in batch and



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other process (synthesis) where	opportunity for exposure arises) (PROC4)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	k management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	
Other operational conditions affecting	na workers exposure
Outdoor / Indoor	: Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	vond the REACH Chemical Safety Assessment : Wear solely goggles.
	worker exposure: Professional use (Transfer of ing/discharging) from/to vessels/large containers at a)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Both hands
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
<b>Risk management measures</b> Exposure routes Technical conditions and measures	<ul><li>Inhalation</li><li>Local exhaust ventilation</li></ul>



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Effectiveness (of a measure) Personal protective measures Effectiveness (of a measure)	<ul> <li>80 %</li> <li>If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.</li> <li>80 %</li> </ul>
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
	vorker exposure: Professional use (Transfer of ng/discharging) from/to vessels/large containers at
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affectin Outdoor / Indoor	n <b>g workers exposure</b> : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
10.2.6 ES 10 - CS 6: Control of w or brushing) (PROC10)	vorker exposure: Professional use (Roller application
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Both hands



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Exposure routes	: Inhalation exposure
Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 80 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 80 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

### 10.2.7 ES 10 - CS 7: Control of worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Amount used Amounts used	: 0,05 L/min
Frequency and duration of use Exposure duration Frequency of use	∶ 150 min ∶ <= 5 days per week
Human factors not influenced by ris Dermal exposure	k management : Whole body
Other operational conditions affectin Outdoor / Indoor Room size	ng workers exposure : Indoor : <= 1000 m3
<b>Risk management measures</b> Personal protective measures Effectiveness (of a measure)	<ul> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>
Personal protective measures	: Wear suitable working clothes. Wear suitable coveralls to prevent exposure to the skin.



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Effectiveness (of a measure)	: 80 %
Personal protective measures	: Wear a respirator conforming to EN140 with type A filter or better.
Effectiveness (of a measure)	: 40 %
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the distance from worker to task is greater tha m.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the direction of airflow is clearly away from the worker.
Note	: Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	: Provide enhanced general ventilation by mechanical mear
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

### 10.2.8 ES 10 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid



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Vapour pressure	: 0,123 hPa	
Frequency and duration of use		
Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by ris		
Dermal exposure	: Palm of both hands	
Exposed skin surface assumed	: 480 cm <sup>2</sup>	
Other operational conditions affecting workers exposure		
Outdoor / Indoor	: Indoor	
Risk management measures		
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in	
	combination with 'basic' employee training.	
Effectiveness (of a measure)	: 90 %	
Additional good practice advice beyond the REACH Chemical Safety Assessment		
Additional good practice advice	-	
······		

### **10.3. ES 10** Exposure estimation and reference to its source

10.3.2 ES 10 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or	0,22



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	formulation))	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23

### 10.3.3 ES 10 - CS 3: Worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,80

## 10.3.4 ES 10 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

## 10.3.5 ES 10 - CS 5: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to	0,80



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vessels/large containers at dedicated facilities

### 10.3.6 ES 10 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 10.3.7 ES 10 - CS 7: Worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
Human health (combined for all exposure routes)	Not applicable	0,91

### 10.3.8 ES 10 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Treatment of articles by dipping and pouring	0,75

## **10.4. ES 10** Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2



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#### 11. ES 11: Consumer use; Use in cleaning agents

#### 11.1. Titles of Contributing scenarios (CS)

Wash	Washing and cleaning products (including solvent based products) (PC35)		
Enviro	Environment		
CS1:	Consumer use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems)	ERC8a, ERC8d	
Consu	Imer		
CS2:	Consumer use (Washing and cleaning products (including solvent based products))	PC35	
CS3:	Consumer use (Washing and cleaning products (including solvent based products))	PC35	
CS4:	Consumer use (Washing and cleaning products (including solvent based products))	PC35	
CS5:	Consumer use (Washing and cleaning products (including solvent based products))	PC35	
CS6:		PC35	
CS7:		PC35	

#### 11.2. ES 11 Conditions of use affecting exposure

# 11.2.1 ES 11 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems) (ERC8a, ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 11.2.2 ES 11 - CS 2: Control of consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Remarks

: No spraying Default database: cleaning and washing/all purpose cleaner/liquid/mixing and loading



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Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 20 %
Molecular weight	: 22 g/mol
Physical Form (at time of use) Vapour pressure	: Liquid : 0,123 hPa
Amount used	
Amounts used	: 0,5 kg/day
Frequency and duration of use	
Application duration	: 0,3 min
Frequency of use Remarks	: 104 days per year
Remarks Exposure duration	: Type of activity or process, light work : 0,75 min
Human factors not influenced by ris	
Dermal exposure Exposed skin surface assumed	: Palm of one hand : 215 cm <sup>2</sup>
Exposed skin surface assumed	. 215 CH12
Other given operational conditions a Outdoor / Indoor	affecting consumers exposure : Indoor
Temperature	: 25 °C
Ventilation rate per hour	: 0,5
Mass transfer rate	: 4740 m/min
Release area	: 20 cm <sup>2</sup>
	protection of consumer (e.g. behavioural advice,
personal protection and hygiene) Consumer Measures	: No specific measures identified.
11.2.2. ES. 11. CS. 2. Constrol of a	consumer exposure: Consumer use (Washing and
cleaning products (including sol	
Remarks	: No spraying
	Application
Product characteristics	
Concentration of the Substance in	: <= 4 %
Mixture/Article	
Molecular weight	: 18 g/mol
Physical Form (at time of use)	: Liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,4 kg/day
Frequency and duration of use	
Application duration	: 20 min



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Frequency of use	: 104 days per year
Remarks	: Type of activity or process, light work
Exposure duration	: 240 min
Human factors not influenced by ris	
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 215 cm <sup>2</sup>
Other given operational conditions a	affecting consumers exposure
Outdoor / Indoor	: Indoor
Room size	: 58 m3
Temperature	: 25 °C
Ventilation rate per hour	: 0,5
	4740
Mass transfer rate Release area	: 4740 m/min : 10 m2
Release alea	. 101112
	protection of consumer (e.g. behavioural advice,
personal protection and hygiene)	
Consumer Measures	: No specific measures identified.
11.2.4 ES 11 - CS 4: Control of c cleaning products (including solv	consumer exposure: Consumer use (Washing and vent based products)) (PC35)
Remarks	: Spray cleaners Spraying
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 5 %
Physical Form (at time of use)	: Liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,0468 kg/min
Frequency and duration of use	
Spray duration	: 0,41 min
Frequency of use	: 365 days per year
Exposure duration	: 60 min
Release duration	: 2,6 s
Human factors not influenced by rich	k managamant
Human factors not influenced by ris	: Hands and forearms
Exposed skin surface assumed	
Dermal exposure	: 0,000046 kg/min
	-
Other given operational conditions a	
Outdoor / Indoor	: Indoor
Room size Temperature	: 15 m3 : 25 °C
Ventilation rate per hour	: 2,5 : 2,5
	,-



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Room height	: 2,5 m
Weight percent	: 5%
Remarks	: Non-Volatile
Density	: 1,8 g/cm3
Remarks	: Non-Volatile
Airborne fraction	: 20 %
Remarks	: Non-Volatile
Non-respirable uptake fraction	: 1
Inhalation cut-off diameter	: 0,015 mm

### Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures

: Ensure spraying away from persons.

### 11.2.5 ES 11 - CS 5: Control of consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Remarks	: Spray cleaners Cleaning work		
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 5 %		
Molecular weight Physical Form (at time of use) Vapour pressure	: 22 g/mol : Liquid : 0,123 hPa		
Amount used Amounts used	: 0,0162 kg/day		
Frequency and duration of use Application duration Frequency of use Remarks Exposure duration	<ul> <li>10 min</li> <li>365 days per year</li> <li>Type of activity or process, light work</li> <li>60 min</li> </ul>		
Human factors not influenced by risk managementDermal exposure: Palm of one handExposed skin surface assumed: 215 cm²			
Other given operational conditions a Outdoor / Indoor Room size Temperature Ventilation rate per hour Mass transfer rate	affecting consumers exposure : Indoor : 15 m3 : 25 °C : 2,5 : 4740 m/min		
Release area	: 17100 cm <sup>2</sup>		

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Molecular weight



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Consumer Measures	: No specific measures identified.
11.2.6 ES 11 - CS 6: Control of c cleaning products (including solv	consumer exposure: Consumer use (Washing and vent based products)) (PC35)
Remarks	: Floor cleaning (liquids) Mixing operations (open systems) Loading of application equipment
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 2,5 %
Molecular weight	: 22 g/mol
Physical Form (at time of use)	: Liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,5 kg/day
Frequency and duration of use	
Application duration	: 0,3 min
Frequency of use	: 104 days per year
Remarks	: Type of activity or process, light work
Exposure duration	: 0,75 min
Human factors not influenced by ris	k management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 215 cm <sup>2</sup>
Other given operational conditions a	affecting consumers exposure
Outdoor / Indoor	: Indoor
Temperature	: 25 °C
Ventilation rate per hour	: 1,0
Mass transfer rate	: 4740 m/min
Release area	: 20 cm <sup>2</sup>
Conditions and measures related to personal protection and hygiene)	protection of consumer (e.g. behavioural advice,
Consumer Measures	: No specific measures identified.
11.2.7 ES 11 - CS 7: Control of c cleaning products (including solv	consumer exposure: Consumer use (Washing and vent based products)) (PC35)
Remarks	: Floor cleaning (liquids) Application
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 2,5 %

: 18 g/mol



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Physical Form (at time of use)	
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,88 kg/day
Frequency and duration of use	
Application duration	: 30 min
Frequency of use	: 104 days per year
Remarks	: Type of activity or process, light work
Exposure duration	: 240 min
Human factors not influenced by r	isk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	
Other given operational conditions	s affecting consumers exposure
Outdoor / Indoor	: Indoor
Room size	: 58 m3
Temperature	: 25 °C
Ventilation rate per hour	: 0,5
Mass transfer rate	: 4740 m/min
Release area	: 22 m2
Conditions and measures related	to protection of consumer (e.g. behavioural advice,
personal protection and hygiene)	······································
	Ne en estis este serve el destitie d

#### Consumer Measures : No specific measures identified.

#### 11.3. ES 11 Exposure estimation and reference to its source

#### 11.3.2 ES 11 - CS 2: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,01 mg/m <sup>3</sup> (ConsExpo v4.1)	0,001
Consumer - dermal, long-term - systemic	0,03 mg/kg bw/day (ConsExpo v4.1)	0,0006
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,002

#### 11.3.3 ES 11 - CS 3: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)



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Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,61 mg/m <sup>3</sup> (ConsExpo v4.1)	0,09
Consumer - dermal, long-term - systemic	11,70 mg/kg bw/day (ConsExpo v4.1)	0,22
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,31

### 11.3.4 ES 11 - CS 4: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,000011 mg/m³ (ConsExpo v4.1)	
Consumer - dermal, long-term - systemic	0,01 mg/kg bw/day (ConsExpo v4.1)	0,0002
Consumer - oral, long-term - systemic	0,0006 mg/kg bw/day (ConsExpo v4.1)	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,0002

### 11.3.5 ES 11 - CS 5: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,11 mg/m³ (ConsExpo v4.1)	0,02
Consumer - dermal, long-term - systemic	0,12 mg/kg bw/day (ConsExpo v4.1)	0,002
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,02

### 11.3.6 ES 11 - CS 6: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,01 mg/m <sup>3</sup> (ConsExpo v4.1)	0,001



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Consumer - dermal, long-term - systemic	0,04 mg/kg bw/day (ConsExpo v4.1)	0,0008
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,002

### 11.3.7 ES 11 - CS 7: Consumer exposure: Consumer use (Washing and cleaning products (including solvent based products)) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,38 mg/m <sup>3</sup> (ConsExpo v4.1)	0,05
Consumer - dermal, long-term - systemic	7,31 mg/kg bw/day (ConsExpo v4.1)	0,14
Consumer - oral, long-term - systemic	ConsExpo v4.1, Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,19

# 11.4. ES 11 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 12. ES 12: Industrial use; Use in lubricants

#### 12.1. Titles of Contributing scenarios (CS)

Enviro	Environment			
CS1:	Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of substances in closed systems)	ERC4, ERC7		
Worke	ers			
CS2:	Industrial use (Use in closed process, no likelihood of exposure)	PROC1		
CS3:	Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC2		
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4		
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5		
CS6:	Industrial use (Spraying in industrial settings and applications)	PROC7		



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CS7: Industrial use (Transfer of substance or preparation	PROC8a
(charging/discharging) from/to vessels/large containers a facilities)	t non dedicated
CS8: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers a facilities, Transfer of substance or preparation into small (dedicated filling line, including weighing))	
CS9: Industrial use (Roller application or brushing)	PROC10
CS10: Industrial use (Treatment of articles by dipping and pourir	ng) PROC13
CS11: Industrial use (Lubrication at high energy conditions and in partly open PROC17, PROC18 process, Greasing at high energy conditions)	

#### 12.2. ES 12 Conditions of use affecting exposure

# 12.2.1 ES 12 - CS 1: Control of environmental exposure: Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of substances in closed systems) (ERC4, ERC7)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 12.2.2 ES 12 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris	•
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor



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Risk management measures Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure
Additional good practice advice bey Additional good practice advice	<ul> <li>vond the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> </ul>
	worker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: Use in closed, continuous process with occasional controller exposure No specific measures identified.
Additional good practice advice bey Additional good practice advice	<ul> <li>vond the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> </ul>
	worker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where (PROC3, PROC4)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure	<b>k management</b> : Palm of one hand



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Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in batch and other process (synthesis) where opportuni for exposure arises
Other operational conditions affect Outdoor / Indoor	t <b>ing workers exposure</b> : Indoor
Risk management measures	
Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportuni
	for exposure arises
	No specific measures identified.
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment
<b>C</b> .	
12.2.5 ES 12 - CS 5: Control of	worker exposure: Industrial use (Mixing or blending in
12.2.5 ES 12 - CS 5: Control of batch processes for formulatior	: Wear solely goggles. worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or
12.2.5 ES 12 - CS 5: Control of	worker exposure: Industrial use (Mixing or blending in
12.2.5 ES 12 - CS 5: Control of batch processes for formulatior	worker exposure: Industrial use (Mixing or blending in
12.2.5 ES 12 - CS 5: Control of batch processes for formulatior significant contact)) (PROC5)	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or
12.2.5 ES 12 - CS 5: Control of batch processes for formulatior significant contact)) (PROC5) Product characteristics	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : <= 100 %
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use)	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : <= 100 % : Low volatile liquid
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : <= 100 %
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure	worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : <= 100 % : Low volatile liquid
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> </ul>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> </ul>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ri	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> </ul>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ri Dermal exposure	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> </ul>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ri	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>sk management</li> </ul>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use) Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ri <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year isk management : Palm of both hands : 480 cm<sup>2</sup></pre>
12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5) Product characteristics Concentration of the Substance in Mixture/Article Physical Form (at time of use) Vapour pressure Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ri Dermal exposure	<ul> <li>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> <li>: 0,123 hPa</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>isk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics <ul> <li>Concentration of the Substance in Mixture/Article</li> <li>Physical Form (at time of use) Vapour pressure</li> </ul> </li> <li>Frequency and duration of use <ul> <li>Exposure duration</li> <li>Frequency of use</li> </ul> </li> <li>Human factors not influenced by ri <ul> <li>Dermal exposure</li> <li>Exposed skin surface assumed</li> </ul> </li> <li>Other operational conditions affect Outdoor / Indoor</li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year sk management : Palm of both hands : 480 cm<sup>2</sup> ting workers exposure</pre>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ri     Dermal exposure     Exposed skin surface assumed</li> <li>Other operational conditions affect     Outdoor / Indoor</li> <li>Risk management measures</li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year sk management : Palm of both hands : 480 cm<sup>2</sup> ting workers exposure : Indoor</pre>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ri     Dermal exposure     Exposed skin surface assumed</li> <li>Other operational conditions affect     Outdoor / Indoor</li> <li>Risk management measures     Exposure routes</li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year sk management : Palm of both hands : 480 cm<sup>2</sup> ting workers exposure : Indoor : Dermal exposure</pre>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ri     Dermal exposure     Exposed skin surface assumed</li> <li>Other operational conditions affect     Outdoor / Indoor</li> <li>Risk management measures</li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in n of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year isk management : Palm of both hands : 480 cm<sup>2</sup> ting workers exposure : Indoor : Dermal exposure : Wear chemically resistant gloves (tested to EN374) in</pre>
<ul> <li>12.2.5 ES 12 - CS 5: Control of batch processes for formulation significant contact)) (PROC5)</li> <li>Product characteristics     Concentration of the Substance in Mixture/Article     Physical Form (at time of use)     Vapour pressure</li> <li>Frequency and duration of use     Exposure duration     Frequency of use</li> <li>Human factors not influenced by ri     Dermal exposure     Exposed skin surface assumed</li> <li>Other operational conditions affect     Outdoor / Indoor</li> <li>Risk management measures     Exposure routes</li> </ul>	<pre>worker exposure: Industrial use (Mixing or blending in of preparations and articles (multistage and/or : &lt;= 100 % : Low volatile liquid : 0,123 hPa : &lt;= 480 min : &lt;= 240 days per year sk management : Palm of both hands : 480 cm<sup>2</sup> ting workers exposure : Indoor : Dermal exposure</pre>



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12.2.6 ES 12 - CS 6: Control of vindustrial settings and application	-	Industrial use (Spraying in
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	t de la construcción de la const
Amount used Amounts used	: 0,6 L/min	
Frequency and duration of use		
Exposure duration	: 360 min	
Frequency of use	: <= 5 days per we	eek
Human factors not influenced by ris Dermal exposure	sk management : Whole body	
Other operational conditions affecti	ng workers exposur	e
Outdoor / Indoor	: Indoor	
Room size	: > 1000 m3	
Risk management measures Technical conditions and		atilation
measures	: Local exhaust ve	ntilation
Effectiveness (of a measure)	: 50 %	
Note	: Ensure that the d worker.	lirection of airflow is clearly away from the
Personal protective measures		resistant gloves (tested to EN374) in 'basic' employee training.
Effectiveness (of a measure)	: 90 %	
Personal protective measures	: Wear suitable wo Wear suitable co	orking clothes. veralls to prevent exposure to the skin.
Effectiveness (of a measure)	: 80 %	
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the d m.	listance from worker to task is greater than 1
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direc downward.	tion of application is only horizontal or
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning	of work area
Organisational measures to prevent /limit releases, dispersion	: Regular cleaning	of equipment



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	2 a.e. e. p
and exposure	
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.
	vorker exposure: Industrial use (Transfer of ing/discharging) from/to vessels/large containers at a)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	k management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecti	•
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Inhalation exposure
Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 90 %
Personal protective measures	: If technical exhaust or ventilation measures are not possibl or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 90 %
• • •	ond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.

12.2.8 ES 12 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics Concentration of the Substance in : <= 100 % Mixture/Article



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ied.
use (Roller application o
oves (tested to EN374) in
loyee training.
noyee training.

12.2.10 ES 12 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)



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<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	ing workers exposure : Indoor
Risk management measures Exposure routes Personal protective measures Effectiveness (of a measure)	<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	of worker exposure: Industrial use (Lubrication at higl open process, Greasing at high energy conditions)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	sk management : Both hands : 960 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	ing workers exposure : Indoor
Risk management measures Exposure routes	: Inhalation exposure



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Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 90 %
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Note	<ul> <li>Lubrication at high energy conditions and in partly open process</li> </ul>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

#### 12.3. ES 12 Exposure estimation and reference to its source

12.3.2 ES 12 - CS 2: Worker exposure: Industrial use (Use in closed process, no
likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

### 12.3.3 ES 12 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 12.3.4 ES 12 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 12.3.5 ES 12 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

### 12.3.6 ES 12 - CS 6: Worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
Human health (combined for all exposure routes)	Not applicable	0,80

# 12.3.7 ES 12 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 12.3.8 ES 12 - CS 8: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 12.3.9 ES 12 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,77



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### 12.3.10 ES 12 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

# 12.3.11 ES 12 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions and in partly open process, Greasing at high energy conditions) (PROC17, PROC18)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process	0,10
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Greasing at high energy conditions)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Greasing at high energy conditions)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Greasing at high energy conditions	0,20

# 12.4. ES 12 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 13. ES 13: Industrial use; Metal working fluids

13.1. Titles of Contributing scenarios (CS)



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Environment				
CS1:	Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles)	ERC4		
Worke	rs			
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC1 PROC2		
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4		
CS5:	Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5		
CS6:	Industrial use (Spraying in industrial settings and applications)	PROC7		
CS7:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a		
CS8:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9		
CS9:	Industrial use (Roller application or brushing)	PROC10		
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13		
CS11:	Industrial use (Lubrication at high energy conditions and in partly open process)	PROC17		

#### 13.2. ES 13 Conditions of use affecting exposure

13.2.1 ES 13 - CS 1: Control of environmental exposure: Industrial use (Industrial use of processing aids in processes and products, not becoming part of articles) (ERC4)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

#### 13.2.2 ES 13 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

**Product characteristics** 

Concentration of the Substance in : <= 100 %Mixture/Article

Physical Form (at time of use) : Low volatile liquid



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Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
	1
Human factors not influenced by ris Dermal exposure	: Palm of one hand
Exposed skin surface assumed	
	. 240 011
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Technical conditions and	· Lies in closed presses, no likelihood of experience
measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
measures	Sample via a closed loop of other system to avoid exposure.
Additional good practice advice bey Additional good practice advice	<pre>/ond the REACH Chemical Safety Assessment</pre>
	worker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
Product characteristics	
Concentration of the Substance in	: <= 100 %
Mixture/Article	
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Frequency and duration of use Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other exercises I conditions offecti	
Other operational conditions affecti Outdoor / Indoor	: Indoor
	. 11000
Risk management measures Note	. Use in closed, continuous process with assessmel controlled
NULE	: Use in closed, continuous process with occasional controlled exposure
	No specific measures identified.
Additional good practice advice bey Additional good practice advice	<pre>/ond the REACH Chemical Safety Assessment         : Wear solely goggles.</pre>

13.2.4 ES 13 - CS 4: Control of worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)



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Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in batch and other process (synthesis) where opportunit
	for exposure arises
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunit
	for exposure arises
	No specific measures identified.
Additional good practice advice bey Additional good practice advice	<pre>vond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>
13.2.5 ES 13 - CS 5: Control of v	worker exposure: Industrial use (Mixing or blending in
	of preparations and articles (multistage and/or
Product characteristics Concentration of the Substance in	: <= 100 %
Mixture/Article	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
	: <= 480 min
Exposure duration	
	: <= 240 days per year
Exposure duration Frequency of use Human factors not influenced by ris	sk management
Exposure duration Frequency of use	sk management : Palm of both hands



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Risk management measures		
Exposure routes	:	Dermal exposure
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

#### Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

### 13.2.6 ES 13 - CS 6: Control of worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Amount used Amounts used	: 0,6 L/min
Frequency and duration of use Exposure duration Frequency of use	: 360 min : <= 5 days per week
Human factors not influenced by ris Dermal exposure	k management : Whole body
Other operational conditions affection Outdoor / Indoor Room size	ng workers exposure : Indoor : >1000 m3
<b>Risk management measures</b> Technical conditions and measures Effectiveness (of a measure) Note	<ul> <li>: Local exhaust ventilation</li> <li>: 50 %</li> <li>: Ensure that the direction of airflow is clearly away from the worker.</li> </ul>
Personal protective measures Effectiveness (of a measure)	<ul> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>
Personal protective measures Effectiveness (of a measure)	<ul> <li>Wear suitable working clothes.</li> <li>Wear suitable coveralls to prevent exposure to the skin.</li> <li>80 %</li> </ul>



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Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Additional good practice advice bey	ond the REACH Chemical Safety Assessment

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

# 13.2.7 ES 13 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Both hands
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
<b>Risk management measures</b> Exposure routes Technical conditions and measures Effectiveness (of a measure) Personal protective measures	<ul> <li>Inhalation exposure</li> <li>Local exhaust ventilation</li> <li>90 %</li> <li>If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.</li> </ul>
Effectiveness (of a measure)	: 90 %



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Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

# 13.2.8 ES 13 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affection outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
Additional good practice advice	
Additional good practice advice	: Wear solely goggles. worker exposure: Industrial use (Roller application or
Additional good practice advice <b>13.2.9 ES 13 - CS 9: Control of</b> <b>brushing) (PROC10)</b> <b>Product characteristics</b> Concentration of the Substance in	: Wear solely goggles. worker exposure: Industrial use (Roller application or
Additional good practice advice <b>13.2.9 ES 13 - CS 9: Control of brushing) (PROC10)</b> <b>Product characteristics</b> Concentration of the Substance in Mixture/Article Physical Form (at time of use)	<ul> <li>: Wear solely goggles.</li> <li>worker exposure: Industrial use (Roller application or</li> <li>: &lt;= 100 %</li> <li>: Low volatile liquid</li> </ul>

#### Other operational conditions affecting workers exposure



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Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Additional good practice advice bey Additional good practice advice	<ul> <li>vond the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> </ul>
13.2.10 ES 13 - CS 10: Control of articles by dipping and pouring)	of worker exposure: Industrial use (Treatment of (PROC13)
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	k management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Additional good practice advice bey Additional good practice advice	rond the REACH Chemical Safety Assessment : Wear solely goggles.
13.2.11 ES 13 - CS 11: Control of energy conditions and in partly of	of worker exposure: Industrial use (Lubrication at high open process) (PROC17)
Product characteristics Concentration of the Substance in	100 %
Mixture/Article	. <= 100 /0

Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
vapour pressure	: 0,123 hPa

#### Frequency and duration of use



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Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by risk	amanagement
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affectin	a workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Inhalation exposure
Technical conditions and measures	: Local exhaust ventilation
Effectiveness (of a measure)	: 90 %
Exposure routes	: Dermal exposure
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
	and the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.

#### 13.3. ES 13 Exposure estimation and reference to its source

13.3.2 ES 13 - CS 2:	Worker exposure: Industrial use (Use in closed process, no
likelihood of exposu	re) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

## 13.3.3 ES 13 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07

Human health (combined for

all exposure routes)



0,08

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Worker - dermal, long-term - svstemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01

ECETOC TRA v2.0 worker; modified version

# 13.3.4 ES 13 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 13.3.5 ES 13 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

### 13.3.6 ES 13 - CS 6: Worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	9,79 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,28



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- local and systemic Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
Human health (combined for all exposure routes)	Not applicable	0,80

# 13.3.7 ES 13 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 13.3.8 ES 13 - CS 8: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic		
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

13.3.9 ES 13 - CS 9: Worker exposure: Industrial use (Roller application or brushing)



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#### (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,77

### 13.3.10 ES 13 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 13.3.11 ES 13 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions and in partly open process) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Lubrication at high energy conditions and in partly open process	0,10

# 13.4. ES 13 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 14. ES 14: Professional use; Metal working fluids



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#### 14.1. Titles of Contributing scenarios (CS)

Enviro	Environment			
CS1:	Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems)	ERC8a, ERC8d		
Worke	IS			
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation))	PROC1, PROC2, PROC3		
CS3:	Professional use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	PROC5		
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a		
CS5:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9		
CS6:	Professional use (Roller application or brushing)	PROC10		
CS7:	Professional use (Spraying outside industrial settings and/or applications)	PROC11		
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13		
CS9:	Professional use (Lubrication at high energy conditions and in partly open process)	PROC17		

#### 14.2. ES 14 Conditions of use affecting exposure

14.2.1 ES 14 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems) (ERC8a, ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

14.2.2 ES 14 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)



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Version . 5 - 27 EO	Date of printing . 18.12.2017
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	ak managamant
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	$240 \text{ cm}^2$
Remarks	: Use in closed process, no likelihood of exposure, Use in
	closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed Remarks	<ul> <li>480 cm<sup>2</sup></li> <li>Use in closed, continuous process with occasional controlled</li> </ul>
Remarks	exposure
Risk management measures Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure
Technical conditions and measures	: Use in closed, continuous process with occasional controlled exposure
Technical conditions and measures	: Use in closed batch process (synthesis or formulation) With occasional controlled exposure
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	worker exposure: Professional use (Mixing or formulation of preparations and articles (multistage DC5)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use	. <- 480 min

Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year

#### Human factors not influenced by risk management



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Dermal exposure	: Palm of both hands
Exposed skin surface assumed	$: 480 \text{ cm}^2$
Other operational conditions affectin	
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: No specific measures identified.
Additional good practice advice beyo Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
Additional good practice advice	. Wear solely goggles.
14.2.4 ES 14 - CS 4: Control of w	orker exposure: Professional use (Transfer of
substance or preparation (charging	ng/discharging) from/to vessels/large containers at
non dedicated facilities) (PROC8a	
Product characteristics	
Concentration of the Substance in	· <= 100 %
Mixture/Article	. <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
llumen feature not influenced by viol	
Human factors not influenced by risk Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affectin	
Outdoor / Indoor	: Indoor
Risk management measures	
Exposure routes	: Inhalation
Technical conditions and	: Local exhaust ventilation
measures	
Effectiveness (of a measure)	: 80 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible
	or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 80 %
Additional good practice advice bevo	ond the REACH Chemical Safety Assessment
Additional good practice advice beyo	: Wear solely goggles.
. Salisiai good practice advice	

14.2.5 ES 14 - CS 5: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

**Product characteristics** 



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		<u> </u>
Concentration of the Substance in : Mixture/Article	<= 100 %	
	Low volatile liquid 0,123 hPa	
Frequency and duration of use		
	<= 480 min	
Frequency of use :	<= 240 days per year	
Human factors not influenced by risk r		
	Palm of both hands 480 cm <sup>2</sup>	
Exposed skin sunace assumed .	460 CM <sup>2</sup>	
Other operational conditions affecting Outdoor / Indoor :	workers exposure Indoor	
Risk management measures Note :	No specific measures identif	ied.
Additional good practice advice beyon Additional good practice advice :	d the REACH Chemical Safe Wear solely goggles.	ety Assessment
14.2.6 ES 14 - CS 6: Control of wo or brushing) (PROC10)	rker exposure: Profession	nal use (Roller application
Product characteristics Concentration of the Substance in : Mixture/Article	<= 100 %	
	Low volatile liquid 0,123 hPa	
Frequency and duration of use		
	<= 480 min	
•	<= 240 days per year	
Human factors not influenced by risk r	nanagement	
	Both hands 960 cm <sup>2</sup>	
Exposed skill surface assumed .	960 CH-	
Other operational conditions affecting Outdoor / Indoor	workers exposure Indoor	
Risk management measures		
	Dermal exposure	
	Wear chemically resistant gl combination with 'basic' emp 90 %	
Effectiveness (of a measure) :	JU /0	
Exposure routes :	Inhalation exposure	
	Local exhaust ventilation	



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measures	
Effectiveness (of a measure)	: 80 %
Personal protective measures	: If technical exhaust or ventilation measures are not possibl or insufficient, respiratory protection must be worn.
Effectiveness (of a measure)	: 80 %
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.
14.2.7 ES 14 - CS 7: Control of v industrial settings and/or applica	worker exposure: Professional use (Spraying outside ations) (PROC11)
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,05 L/min
Frequency and duration of use	
Exposure duration	: 150 min
Frequency of use	: <= 5 days per week
Human factors not influenced by ris Dermal exposure	sk management : Whole body
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Room size	: <= 1000 m3
Risk management measures	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Personal protective measures	: Wear suitable working clothes.
Effectiveness (of a measure)	Wear suitable coveralls to prevent exposure to the skin. : 80 %
Personal protective measures	: Wear a respirator conforming to EN140 with type A filter or better.
Effectiveness (of a measure)	: 40 %
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion	: Ensure that the distance from worker to task is greater thar m.



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Organisational measures to prevent /limit releases, dispersion and exposure Note	: Ensure that the direction of airflow is clearly away from the worker.
	: Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	: Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the task is not carried out by more than one worker simultaneously.
Additional good practice advice bey	yond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

### 14.2.8 ES 14 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use		
Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands	
Other operational conditions affecting workers exposure         Outdoor / Indoor       : Indoor		
Risk management measures Personal protective measures	: Wear chemically resistant gloves (tested to EN374) combination with 'basic' employee training.	



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Effectiveness (of a measure)	: 90 %	
Additional good practice advice beyo	and the REACH Chemical Safe	aty Assassment
Additional good practice advice beyo	: Wear solely goggles.	ety Assessment
14.2.9 ES 14 - CS 9: Control of w		
high energy conditions and in par	tly open process) (PROC1	()
Product characteristics		
Concentration of the Substance in	: <= 100 %	
Mixture/Article		
Physical Form (at time of use)	: Low volatile liquid	
Vapour pressure	: 0,123 hPa	
	. 0,1201114	
Frequency and duration of use		
Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by risk	management	
Dermal exposure	: Both hands	
Exposed skin surface assumed	: 960 cm <sup>2</sup>	
Other energianal conditions offection	a workers expective	
Other operational conditions affectin Outdoor / Indoor	: Indoor	
Risk management measures		
Exposure routes	: Inhalation exposure	
Technical conditions and	: Local exhaust ventilation	
measures		
Effectiveness (of a measure)	: 90 %	
Exposure routes	: Dermal exposure	
Personal protective measures	: Wear chemically resistant gl	oves (tested to EN374) in
	combination with 'basic' emp	
Effectiveness (of a measure)	: 90 %	-
Additional good practice advice bevo	nd the REACH Chemical Safe	etv Assessment

#### Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

. wear solely goggles.

#### 14.3. ES 14 Exposure estimation and reference to its source

14.3.2 ES 14 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23

## 14.3.3 ES 14 - CS 3: Worker exposure: Professional use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact))	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0,75

## 14.3.4 ES 14 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

# 14.3.5 ES 14 - CS 5: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,80

### 14.3.6 ES 14 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40



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### 14.3.7 ES 14 - CS 7: Worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
Human health (combined for all exposure routes)	Not applicable	0,91

### 14.3.8 ES 14 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 14.3.9 ES 14 - CS 9: Worker exposure: Professional use (Lubrication at high energy conditions and in partly open process) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 14.4. ES 14 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 15. ES 15: Professional use; Use in agrochemicals



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#### 15.1. Titles of Contributing scenarios (CS)

Environment			
CS1:	Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems)	ERC8a, ERC8d	
Worke	rs		
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure)	PROC1, PROC2	
CS3:	Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC4	
CS4:		PROC8a	
CS5:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC8b, PROC9	
CS6:	Professional use (Spraying outside industrial settings and/or applications)	PROC11	
CS7:	Professional use (Treatment of articles by dipping and pouring)	PROC13	

#### 15.2. ES 15 Conditions of use affecting exposure

15.2.1 ES 15 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems) (ERC8a, ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

15.2.2 ES 15 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Product characteristics<br/>Concentration of the Substance in<br/>Mixture/Article: <= 100 %</th>Physical Form (at time of use): Low volatile liquid



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Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ri	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Remarks	: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in closed, continuous process with occasional controlled exposure
Other operational conditions affect	ing workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	: Use in closed, continuous process with occasional controlled exposure
Additional good practice advice be Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.

### 15.2.3 ES 15 - CS 3: Control of worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %			
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa			
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year			
Human factors not influenced by risk managementDermal exposure:Palm of both handsExposed skin surface assumed:480 cm²				
Other operational conditions affecting workers exposure           Outdoor / Indoor         : Indoor				
Risk management measures Note	: No specific measures identified.			



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Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

## 15.2.4 ES 15 - CS 4: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year		
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Both hands		
Other operational conditions affecting workers exposure Outdoor / Indoor : Indoor			
<b>Risk management measures</b> Exposure routes Technical conditions and measures Effectiveness (of a measure) Personal protective measures Effectiveness (of a measure)	<ul> <li>Inhalation</li> <li>Local exhaust ventilation</li> <li>80 %</li> <li>If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.</li> <li>80 %</li> </ul>		

#### Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

15.2.5 ES 15 - CS 5: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration	: <= 480 min



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Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	i <b>ng workers exposure</b> : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey	yond the REACH Chemical Safety Assessment
Additional good practice advice	
15.2.6 ES 15 - CS 6: Control of industrial settings and/or application	worker exposure: Professional use (Spraying outside ations) (PROC11)
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,05 L/min
Frequency and duration of use	
Exposure duration	: 150 min
Frequency of use	: <= 5 days per week
Human factors not influenced by ris	sk management
Dermal exposure	: Whole body
Other operational conditions affecti	ing workers exposure
Outdoor / Indoor	: Indoor
Room size	: <= 1000 m3
Risk management measures	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Personal protective measures	: Wear suitable working clothes.
Effectiveness (of a measure)	Wear suitable coveralls to prevent exposure to the skin. : 80 %
Personal protective measures	: Wear a respirator conforming to EN140 with type A filter or
	better.
Effectiveness (of a measure)	: 40 %



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Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the direction of airflow is clearly away from the worker.
Note	: Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	: Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure that the task is not carried out by more than one worker simultaneously.
Additional good practice advice bey	und the REACH Chemical Safety Assessment

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

### 15.2.7 ES 15 - CS 7: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics Concentration of the Substance in Mixture/Article	:	<= 100 %		
Physical Form (at time of use) Vapour pressure		Low volatile liquid 0,123 hPa		
Frequency and duration of use				
Exposure duration	:	<= 480 min		
Frequency of use	:	<= 240 days per year		
Human factors not influenced by risk management				
Dermal exposure	:	Palm of both hands		
Exposed skin surface assumed	:	480 cm <sup>2</sup>		



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#### Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Risk management measures Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
Effectiveness (of a measure)	combination with 'basic' employee training. : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

#### 15.3. ES 15 Exposure estimation and reference to its source

15.3.2 ES 15 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	0,0007
<ul> <li>local and systemic</li> </ul>	version, Use in closed process, no likelihood of exposure)	
Worker - dermal, long-term -	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified	0,003
systemic	version, Use in closed process, no likelihood of exposure)	
Human health (combined for	ECETOC TRA v2.0 worker; modified version, Use in	0,004
all exposure routes)	closed process, no likelihood of exposure	
Worker - inhalative, long-term	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	0,37
- local and systemic	version, Use in closed, continuous process with	
	occasional controlled exposure)	
Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified	0,01
systemic	version, Use in closed, continuous process with	
	occasional controlled exposure)	
Human health (combined for	ECETOC TRA v2.0 worker; modified version, Use in	0,38
all exposure routes)	closed, continuous process with occasional controlled	
	exposure	

### 15.3.3 ES 15 - CS 3: Worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06



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Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,80

## 15.3.4 ES 15 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

# 15.3.5 ES 15 - CS 5: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,80

### 15.3.6 ES 15 - CS 6: Worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
Human health (combined for all exposure routes)	Not applicable	0,91

### 15.3.7 ES 15 - CS 7: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 15.4. ES 15 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 16. ES 16: Industrial use; Use in functional fluids

#### 16.1. Titles of Contributing scenarios (CS)

Enviro	Environment		
CS1:	Industrial use (Industrial use of substances in closed systems)	ERC7	
Worke	rs		
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC1 PROC2	
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4	
CS5:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a	
CS6:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated	PROC8b, PROC9	



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facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))

#### 16.2. ES 16 Conditions of use affecting exposure

16.2.1 ES 16 - CS 1: Control of environmental exposure: Industrial use (Industrial use of substances in closed systems) (ERC7)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 16.2.2 ES 16 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Product	charac	teristics	3
-	-		

Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by risl Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other operational conditions affectir	ng workers exposure : Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

16.2.3 ES 16 - CS 3: Control of worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)



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<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
<b>requency and duration of use</b> Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
	<ul> <li>management</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> </ul>
Other operational conditions affecting Outdoor / Indoor	<b>g workers exposure</b> : Indoor
Risk management measures Note	<ul> <li>Use in closed, continuous process with occasional controlle exposure No specific measures identified.</li> </ul>
	<ul> <li>md the REACH Chemical Safety Assessment</li> <li>Wear solely goggles.</li> </ul>
	orker exposure: Industrial use (Use in closed batch ), Use in batch and other process (synthesis) where PROC3, PROC4)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
	: <= 480 min : <= 240 days per year
luman factors not influenced by risk Dermal exposure Exposed skin surface assumed Remarks Dermal exposure	<ul> <li>management</li> <li>Palm of one hand</li> <li>240 cm<sup>2</sup></li> <li>Use in closed batch process (synthesis or formulation)</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> </ul>
•	: Use in batch and other process (synthesis) where opportuni for exposure arises



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<b>Risk management measures</b> Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises No specific measures identified.
Additional good practice advice bey Additional good practice advice	<pre>/ond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>
	worker exposure: Industrial use (Transfer of ing/discharging) from/to vessels/large containers at a)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure	sk management : Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
<b>Risk management measures</b> Exposure routes Technical conditions and	<ul><li>Inhalation exposure</li><li>Local exhaust ventilation</li></ul>
measures Effectiveness (of a measure) Personal protective measures	<ul> <li>90 %</li> <li>If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.</li> </ul>
Effectiveness (of a measure)	or insufficient, respiratory protection must be worn. : 90 %
	yond the REACH Chemical Safety Assessment : Wear solely goggles.

16.2.6 ES 16 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

**Product characteristics** 



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Concentration of the Substance in Mixture/Article	: <= 100 %	
Vapour pressure Physical Form (at time of use)	<ul> <li>Low volatile liquid</li> <li>0,123 hPa</li> <li>Low volatile liquid</li> <li>0,123 hPa</li> </ul>	
Frequency of use Exposure duration	<ul> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> </ul>	
Exposed skin surface assumed Dermal exposure	<ul> <li>management</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> </ul>	
Other operational conditions affecting Outdoor / Indoor Outdoor / Indoor	<b>g workers exposure</b> : Indoor : Indoor	
Risk management measures Note	: No specific measures ident	ified.
Note	: No specific measures ident	ified.
Additional good practice advice beyo Additional good practice advice		fety Assessment

#### 16.3. ES 16 Exposure estimation and reference to its source

### 16.3.2 ES 16 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004



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### 16.3.3 ES 16 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

## 16.3.4 ES 16 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

## 16.3.5 ES 16 - CS 5: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20



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16.3.6 ES 16 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

#### 16.4. ES 16 Guidance to Downstream User to evaluate whether he



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#### works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

#### 17. ES 17: Professional use; Use in functional fluids

#### 17.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Professional use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems)	ERC9a, ERC9b
Worke	ers	
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation))	PROC1, PROC2, PROC3
CS3:	Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS5:	Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	PROC9
CS6:	Professional use (Heat and pressure transfer fluids in dispersive use but closed systems)	PROC20

#### 17.2. ES 17 Conditions of use affecting exposure

## 17.2.1 ES 17 - CS 1: Control of environmental exposure: Professional use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems) (ERC9a, ERC9b)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.

The use is assessed to be safe.

17.2.2 ES 17 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with



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occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)				
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %			
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa			
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year			
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Remarks Dermal exposure Exposed skin surface assumed Remarks	<ul> <li>Palm of one hand</li> <li>240 cm<sup>2</sup></li> <li>Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation)</li> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> <li>Use in closed, continuous process with occasional controlled exposure</li> </ul>			
Other operational conditions affect Outdoor / Indoor	ing workers exposure : Indoor			
Risk management measures Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.			
Technical conditions and measures	: Use in closed, continuous process with occasional controlled exposure			
Technical conditions and measures	: Use in closed batch process (synthesis or formulation) With occasional controlled exposure			
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.				
17.2.3 ES 17 - CS 3: Control of worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)				
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %			
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa			
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year			



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Human factors not influenced by risk Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecting Outdoor / Indoor	g workers exposure : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice beyo Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.
	orker exposure: Professional use (Transfer of ng/discharging) from/to vessels/large containers at )
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
	<ul><li>Low volatile liquid</li><li>0,123 hPa</li></ul>
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by risk Dermal exposure	a <b>management</b> : Both hands
•	: 960 cm <sup>2</sup>
Other operational conditions affecting Outdoor / Indoor	g workers exposure : Indoor
Risk management measures	
Exposure routes	: Inhalation
Technical conditions and	: Local exhaust ventilation
measures	
Effectiveness (of a measure)	: 80 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible
Effectiveness (of a measure)	or insufficient, respiratory protection must be worn. : 80 %
Additional good practice advice beyo Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

17.2.5 ES 17 - CS 5: Control of worker exposure: Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC9)



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Product characteristics	
Concentration of the Substance in	: <= 100 %
Mixture/Article	
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Other operational conditions affecti	ing workers exposure
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	worker exposure: Professional use (Heat and rsive use but closed systems) (PROC20)
Product characteristics	
Concentration of the Substance in	: <= 100 %
Mixture/Article	
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
-requency and duration of use	
Frequency and duration of use Exposure duration	: <= 480 min
	: <= 480 min : <= 240 days per year
Exposure duration Frequency of use Human factors not influenced by ris	: <= 240 days per year sk management
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure	: <= 240 days per year sk management : Palm of both hands
Exposure duration Frequency of use Human factors not influenced by ris	: <= 240 days per year sk management
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Other operational conditions affecti	<ul> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> </ul>
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	<ul> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> </ul>
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Other operational conditions affecti Outdoor / Indoor	<ul> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> </ul>
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Other operational conditions affecti	<ul> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> </ul>
Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Other operational conditions affecti Outdoor / Indoor Risk management measures Note	<ul> <li>: &lt;= 240 days per year</li> <li>sk management</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>ing workers exposure</li> <li>: Indoor</li> </ul>



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#### 17.3. ES 17 Exposure estimation and reference to its source

17.3.2 ES 17 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure	0,004
Worker - inhalative, long-term - local and systemic	rker - inhalative, long-term 12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23

### 17.3.3 ES 17 - CS 3: Worker exposure: Professional use (Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,80



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## 17.3.4 ES 17 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

### 17.3.5 ES 17 - CS 5: Worker exposure: Professional use (Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC9)

Route of exposure and type of effects	nd type Exposure estimate	
Worker - inhalative, long-term - local and systemic	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,80

### 17.3.6 ES 17 - CS 6: Worker exposure: Professional use (Heat and pressure transfer fluids in dispersive use but closed systems) (PROC20)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,02
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,39

### 17.4. ES 17 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario



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## 18. ES 18: Consumer use; Heat transfer fluids, Hydraulic fluids

#### 18.1. Titles of Contributing scenarios (CS)

Heat transfer fluids (PC16) Hydraulic fluids (PC17)		
Enviro	onment	
CS1: Consumer use (Wide dispersive indoor use of substances in closed ERC9a, ERC9b systems, Wide dispersive outdoor use of substances in closed systems)		
Consumer		
CS2:	Consumer use (Heat transfer fluids, Hydraulic fluids)	PC16, PC17

#### 18.2. ES 18 Conditions of use affecting exposure

## 18.2.1 ES 18 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems) (ERC9a, ERC9b)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 18.2.2 ES 18 - CS 2: Control of consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Remarks	:	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Product characteristics Concentration of the Substance in Mixture/Article	:	<= 30 %
Physical Form (at time of use) Vapour pressure		Liquid 0,123 hPa
Frequency and duration of use Exposure duration Remarks	•	< 15 min Type of activity or process, light work



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Human factors not influenced by ris	sk management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other given operational conditions	affecting consumers exposure
Outdoor / Indoor	: Indoor
Temperature	: 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures

: No specific measures identified.

#### 18.3. ES 18 Exposure estimation and reference to its source

18.3.2 ES 18 - CS 2: Consumer exposure: Consumer use (Heat transfer fluids,
Hydraulic fluids) (PC16, PC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	
Oral exposure	Not applicable	
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	0,36

## 18.4. ES 18 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

## **19. ES 19: Professional use; Anti-freeze and de-icing products**



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#### 19.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Professional use (Wide dispersive outdoor use of processing aids in open systems)	ERC8d
Worke		
CS2:	Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure)	PROC1, PROC2
CS3:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a
CS4:	Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	PROC8b
CS5:	Professional use (Spraying outside industrial settings and/or applications)	PROC11

#### 19.2. ES 19 Conditions of use affecting exposure

### 19.2.1 ES 19 - CS 1: Control of environmental exposure: Professional use (Wide dispersive outdoor use of processing aids in open systems) (ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

19.2.2 ES 19 - CS 2: Control of worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year



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Human factors not influenced by ris	sk managamant
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	$240 \text{ cm}^2$
Remarks	: Use in closed process, no likelihood of exposure, Use in
	closed batch process (synthesis or formulation)
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	: 480 cm <sup>2</sup>
Remarks	: Use in closed, continuous process with occasional controlled
	exposure
Other operational conditions affect	
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure.
Technical conditions and	Line in closed, continuous process with conscional controlled
measures	: Use in closed, continuous process with occasional controlled exposure
measures	exposule
Additional good practice advice be	yond the REACH Chemical Safety Assessment
Additional good practice advice	
5	, , , , , , , , , , , , , , , , , , , ,
19.2.3 ES 19 - CS 3: Control of	worker exposure: Professional use (Transfer of
substance or preparation (charg	jing/discharging) from/to vessels/large containers at
non dedicated facilities) (PROC	
Product characteristics	
Concentration of the Substance in	: <= 100 %
Mixture/Article	

Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa

#### Frequency and duration of use

Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year

#### Human factors not influenced by risk management Dermal exposure : Both hands

Exposed skin surface assumed :		960 cm <sup>2</sup>
--------------------------------	--	---------------------

#### Other operational conditions affecting workers exposure Outdoor / Indoo

oor	:	Indoor

#### Risk management measures

: Inhalation
: Local exhaust ventilation
: 80 %
: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.



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Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

## 19.2.4 ES 19 - CS 4: Control of worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands	
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor	
Risk management measures Note	: No specific measures identified.	
Additional good practice advice bey Additional good practice advice	<pre>/ond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>	
19.2.5 ES 19 - CS 5: Control of industrial settings and/or application	worker exposure: Professional use (Spraying outside ations) (PROC11)	
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Amount used Amounts used	: 0,05 L/min	
Frequency and duration of use Exposure duration Frequency of use	: 150 min : <= 5 days per week	
Human factors not influenced by risk management Dermal exposure : Whole body		



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Other operational conditions affect	ing workers exposure
Outdoor / Indoor	: Indoor
Room size	: <= 1000 m3
Risk management measures	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in
	combination with 'basic' employee training.
Effectiveness (of a measure)	: 90 %
Personal protective measures	: Wear suitable working clothes.
Effectiveness (of a measure)	Wear suitable coveralls to prevent exposure to the skin. : 80 %
Personal protective measures	: Wear a respirator conforming to EN140 with type A filter or
Effectiveness (of a measure)	better. : 40 %
Organisational measures to prevent /limit releases, dispersion	<ul> <li>Ensure that direction of application is only horizontal or downward.</li> </ul>
and exposure	downward.
	. Enclose that the distance from worker to took is proster than 1
Organisational measures to prevent /limit releases, dispersion	: Ensure that the distance from worker to task is greater than 1 m.
and exposure	
Organisational measures to	: Ensure that the direction of airflow is clearly away from the
prevent /limit releases, dispersion	worker.
and exposure	
Note	: Not applicable
Organisational measures to	: Provide enhanced general ventilation by mechanical means.
prevent /limit releases, dispersion and exposure	
Organisational measures to	: Regular cleaning of work area
prevent /limit releases, dispersion and exposure	
·	
Organisational measures to prevent /limit releases, dispersion	: Regular cleaning of equipment
and exposure	
Organisational managements	· Encure regular increation, cleaning and maintenance of
Organisational measures to prevent /limit releases, dispersion	<ul> <li>Ensure regular inspection, cleaning and maintenance of equipment and machines.</li> </ul>
and exposure	
Organisational measures to	: Ensure that the task is not carried out by more than one
prevent /limit releases, dispersion	worker simultaneously.
and exposure	

Additional good practice advice : Wear solely goggles.



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#### 19.3. ES 19 Exposure estimation and reference to its source

19.3.2 ES 19 - CS 2: Worker exposure: Professional use (Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed process, no likelihood of exposure)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in 0 closed process, no likelihood of exposure	
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed, continuous process with occasional controlled exposure	0,38

19.3.3 ES 19 - CS 3: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,50

## 19.3.4 ES 19 - CS 4: Worker exposure: Professional use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	25,88 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified	0,74



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- local and systemic	version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,80

### 19.3.5 ES 19 - CS 5: Worker exposure: Professional use (Spraying outside industrial settings and/or applications) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
Human health (combined for all exposure routes)	Not applicable	0,91

### 19.4. ES 19 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

## 20. ES 20: Consumer use; Anti-freeze and de-icing products

#### 20.1. Titles of Contributing scenarios (CS)

Anti-fr	Anti-freeze and de-icing products (PC4)		
Enviro	nment		
CS1:	Consumer use (Wide dispersive outdoor use of processing aids in open systems)	ERC8d	
Consu	Consumer		
CS2:	Consumer use (Anti-freeze and de-icing products)	PC4	
CS3:	Consumer use (Anti-freeze and de-icing products)	PC4	
CS4:	Consumer use (Anti-freeze and de-icing products)	PC4	

#### 20.2. ES 20 Conditions of use affecting exposure



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### 20.2.1 ES 20 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive outdoor use of processing aids in open systems) (ERC8d)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 20.2.2 ES 20 - CS 2: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks	: De-icing of vehicles and similar equipment by spraying Spraying
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Liquid : 0,123 hPa
Amount used Amounts used	: 0,0468 kg/min
Frequency and duration of use Spray duration Frequency of use Exposure duration	: 0,7 min : 365 days per year : 240 min
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Dermal exposure	: Hands and forearms
Other given operational conditions a Outdoor / Indoor Room size Temperature Ventilation rate per hour	affecting consumers exposure : Indoor : 58 m3 : 25 °C : 0,5
Room height Weight percent Remarks Density	: 2,5 m : 100 % : Non-Volatile : 1,8 g/cm3



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Remarks	: Non-Volatile
Airborne fraction	: 100 %
Remarks Non-respirable uptake fraction	: Non-Volatile : 1
Inhalation cut-off diameter	: 0,015 mm
	protection of consumer (e.g. behavioural advice,
personal protection and hygiene) Consumer Measures	: Ensure spraying away from persons.
20.2.3 ES 20 - CS 3: Control of d de-icing products) (PC4)	consumer exposure: Consumer use (Anti-freeze and
•••••	
Remarks	: De-icing of vehicles and similar equipment by spraying Cleaning work
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Liquid
Vapour pressure	: 0,123 hPa
Amount used	
Amounts used	: 0,00029 kg/day
Frequency and duration of use	
Frequency of use	: 365 days per year
Remarks	: Type of activity or process, light work
Human factors not influenced by ris	k management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 215 cm <sup>2</sup>
Other given operational conditions	
Temperature	: 25 °C
20.2.4 ES 20 - CS 4: Control of d de-icing products) (PC4)	consumer exposure: Consumer use (Anti-freeze and
Product characteristics Concentration of the Substance in	: <= 30 %
Mixture/Article	
Physical Form (at time of use)	
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
	: < 15 min
Exposure duration	
Remarks	: Type of activity or process, light work



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Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other given operational conditions a Outdoor / Indoor Temperature	affecting consumers exposure : Indoor : 25 °C
Conditions and measures related to personal protection and hygiene) Consumer Measures	protection of consumer (e.g. behavioural advice, : No specific measures identified.

#### 20.3. ES 20 Exposure estimation and reference to its source

### 20.3.2 ES 20 - CS 2: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	0,0006 mg/m³ (ConsExpo v4.1)	0,0001
Consumer - dermal, long-term - systemic	0,50 mg/kg bw/day (ConsExpo v4.1)	0,009
Consumer - oral, long-term - systemic	0,005 mg/kg bw/day (ConsExpo v4.1)	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,009

### 20.3.3 ES 20 - CS 3: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	Not applicable	
Consumer - dermal, long-term - systemic	4,46 mg/kg bw/day (ConsExpo v4.1)	0,08
Consumer - oral, long-term - systemic	Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,08

20.3.4 ES 20 - CS 4: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	0,08
Oral exposure	Not applicable	
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	0,36

### 20.4. ES 20 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

#### 21. ES 21: Industrial use, Professional use; Laboratory use

#### 21.1. Titles of Contributing scenarios (CS)

Enviro	Environment		
CS1:	Industrial use, Professional use (Wide dispersive indoor use of	ERC8a	
	processing aids in open systems)		
Worke	rs		
CS2:	Industrial use, Professional use (Use as laboratory reagent)	PROC15	

#### 21.2. ES 21 Conditions of use affecting exposure

21.2.1 ES 21 - CS 1: Control of environmental exposure: Industrial use, Professional use (Wide dispersive indoor use of processing aids in open systems) (ERC8a)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.

The use is assessed to be safe.



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### 21.2.2 ES 21 - CS 2: Control of worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.

#### 21.3. ES 21 Exposure estimation and reference to its source

### 21.3.2 ES 21 - CS 2: Worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

### 21.4. ES 21 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario



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### 22. ES 22: Industrial use; Use in water treatment agents

#### 22.1. Titles of Contributing scenarios (CS)

Enviro	Environment			
CS1:	Industrial use (Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles)	ERC3, ERC4		
Worke	rs			
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional controlled exposure)	PROC1 PROC2		
CS4:	Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises)	PROC3, PROC4		
CS5:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities)	PROC8a		
CS6:	Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	PROC8b		
CS7:	Industrial use (Treatment of articles by dipping and pouring)	PROC13		

#### 22.2. ES 22 Conditions of use affecting exposure

# 22.2.1 ES 22 - CS 1: Control of environmental exposure: Industrial use (Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles) (ERC3, ERC4)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.



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<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of one hand
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed process, no likelihood of exposure Sample via a closed loop or other system to avoid exposure.
Additional good practice advice bey Additional good practice advice	<pre>vond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>
	worker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
Risk management measures Note	: Use in closed, continuous process with occasional controlled exposure No specific measures identified.



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Additional good practice advice <b>22.2.4 ES 22 - CS 4: Control of v</b>	yond the REACH Chemical Safety Assessment : Wear solely goggles. worker exposure: Industrial use (Use in closed batch on), Use in batch and other process (synthesis) where
Product characteristics	
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use Human factors not influenced by ris Dermal exposure Exposed skin surface assumed Remarks Dermal exposure Exposed skin surface assumed Remarks	<ul> <li>: &lt;= 480 min</li> <li>: &lt;= 240 days per year</li> <li>Sk management</li> <li>: Palm of one hand</li> <li>: 240 cm<sup>2</sup></li> <li>: Use in closed batch process (synthesis or formulation)</li> <li>: Palm of both hands</li> <li>: 480 cm<sup>2</sup></li> <li>: Use in batch and other process (synthesis) where opportunity for exposure arises</li> </ul>
Other operational conditions affecti	ing workers exposure
Outdoor / Indoor	: Indoor
<b>Risk management measures</b> Technical conditions and measures	: Use in closed batch process (synthesis or formulation)
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises No specific measures identified.
Additional good practice advice bey	yond the REACH Chemical Safety Assessment
Additional good practice advice	: Wear solely goggles.

Additional good practice advice : Wear solely goggles.

# 22.2.5 ES 22 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa



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Fraguency and duration of use	
Frequency and duration of use Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Frequency of use	. <= 240 days per year
Human factors not influenced by ris	sk management
Dermal exposure	: Both hands
Exposed skin surface assumed	: 960 cm <sup>2</sup>
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
	. 11000
Risk management measures	
Exposure routes	: Inhalation exposure
Technical conditions and	: Local exhaust ventilation
measures	
Effectiveness (of a measure)	: 90 %
Personal protective measures	: If technical exhaust or ventilation measures are not possible
Effectiveness (of a measure)	or insufficient, respiratory protection must be worn. : 90 %
Additional good practice advice bey	ond the REACH Chemical Safety Assessment
Additional good practice advice	
substance or preparation (charg dedicated facilities) (PROC8b) Product characteristics Concentration of the Substance in Mixture/Article	ing/discharging) from/to vessels/large containers at : <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	ek management
Dermal exposure	: Palm of both hands
Exposed skin surface assumed	
Exposed skin sunace assumed	. 460 CIII <sup>2</sup>
Other operational conditions affecti	ng workers exposure
Outdoor / Indoor	: Indoor
Pick management macaures	
Risk management measures	Transfor of automas or proportion (sharring/discharring)
Note	<ul> <li>Transfer of substance or preparation (charging/discharging from/to vessels/large containers at dedicated facilities</li> </ul>

#### Additional good practice advice beyond the REACH Chemical Safety Assessment

No specific measures identified.

Additional good practice advice : Wear solely goggles.



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### 22.2.7 ES 22 - CS 7: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by ris	k management	
Dermal exposure Exposed skin surface assumed	: Palm of both hands : 480 cm <sup>2</sup>	
Other operational conditions affectin Outdoor / Indoor	ng workers exposure : Indoor	
Risk management measures		
Exposure routes	: Dermal exposure	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Effectiveness (of a measure)	: 90 %	
Additional good practice advice beyond the REACH Chemical Safety Assessment		

 Additional good practice advice beyond the REACH Chemical Safety Assessment

 Additional good practice advice
 : Wear solely goggles.

#### 22.3. ES 22 Exposure estimation and reference to its source

### 22.3.2 ES 22 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

22.3.3 ES 22 - CS 3: Worker exposure: Industrial use (Use in closed, continuous



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#### process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 22.3.4 ES 22 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

# 22.3.5 ES 22 - CS 5: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20



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# 22.3.6 ES 22 - CS 6: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,43

### 22.3.7 ES 22 - CS 7: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 22.4. ES 22 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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### 23. ES 23: Consumer use; Adhesives, sealants

#### 23.1. Titles of Contributing scenarios (CS)

Adhesives, sealants (PC1)			
Environment			
CS1: Consumer use (Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix)	ERC8c, ERC8f		
Consumer			
CS2: Consumer use (Adhesives, sealants)	PC1		



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#### 23.2. ES 23 Conditions of use affecting exposure

23.2.1 ES 23 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix) (ERC8c, ERC8f)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 23.2.2 ES 23 - CS 2: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks	: Worst case assumption Mixing operations (open systems) Loading of application equipment		
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 0,075 %		
Molecular weight Physical Form (at time of use) Vapour pressure	: 3.000 g/mol : Liquid : 0,123 hPa		
Amount used Amounts used	: 9 kg/day		
Frequency and duration of use			
Application duration	: 75 min		
Frequency of use Exposure duration	: 0,25 days per year : 75 min		
	. 7511111		
Human factors not influenced by ris	k management		
Exposed skin surface assumed			
Dermal exposure	: 0,00003 kg/min		
Other given operational conditions affecting consumers exposure			
Outdoor / Indoor	: Indoor		
Room size	: 58 m3		
Temperature	: 25 °C		
Ventilation rate per hour	: 0,5		



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a behavioural advice

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures

: No specific measures identified.

### 23.3. ES 23 Exposure estimation and reference to its source

#### 23.3.2 ES 23 - CS 2: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long- term - local and systemic	4,1 mg/m <sup>3</sup> (ConsExpo v4.1)	0,59
Consumer - dermal, long-term - systemic	0,26 mg/kg bw/day (ConsExpo v4.1)	0,005
Consumer - oral, long-term - systemic	Not applicable	
Human health (combined for all exposure routes)	ConsExpo v4.1	0,60

### 23.4. ES 23 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

### 24. ES 24: Industrial use; Manufacture of substance, Adhesives, sealants, Foaming, Coatings, Use in polymer production

#### 24.1. Titles of Contributing scenarios (CS)

Enviro	nment	
CS1:	Industrial use (Formulation of preparations, Formulation in materials, Industrial use resulting in inclusion into or onto a matrix, Industrial use of monomers for manufacture of thermoplastics)	ERC2, ERC3, ERC5, ERC6c
Worke	ers	
CS2: CS3:	Industrial use (Use in closed process, no likelihood of exposure) Industrial use (Use in closed, continuous process with occasional	PROC1 PROC2
000.	controlled exposure)	FILOUZ



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CS4:	Industrial use (Use in closed batch process (synthesis or formula Use in batch and other process (synthesis) where opportunity for exposure arises)		PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes for formulat preparations and articles (multistage and/or significant contact))	tion of	PROC5
CS6:	Industrial use (Spraying in industrial settings and applications)		PROC7
CS7:	Industrial use (Transfer of substance or preparation		PROC8a
	(charging/discharging) from/to vessels/large containers at non de facilities)	edicated	
CS8:	Industrial use (Transfer of substance or preparation		PROC8b, PROC9
	(charging/discharging) from/to vessels/large containers at dedica facilities, Transfer of substance or preparation into small container		
	(dedicated filling line, including weighing))		
CS9:	Industrial use (Roller application or brushing)		PROC10
	Industrial use (Treatment of articles by dipping and pouring)		PROC13
	Industrial use (Production of preparations or articles by tabletting compression, extrusion, pelettisation)	,	PROC14
CS12:	Industrial use (Use as laboratory reagent)		PROC15

#### 24.2. ES 24 Conditions of use affecting exposure

# 24.2.1 ES 24 - CS 1: Control of environmental exposure: Industrial use (Formulation of preparations, Formulation in materials, Industrial use resulting in inclusion into or onto a matrix, Industrial use of monomers for manufacture of thermoplastics) (ERC2, ERC3, ERC5, ERC6c)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed. The use is assessed to be safe.

### 24.2.2 ES 24 - CS 2: Control of worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year



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Human factors not influenced by ris	sk management
Dermal exposure	: Palm of one hand
Exposed skin surface assumed	: 240 cm <sup>2</sup>
Other operational conditions affecti	
Outdoor / Indoor	: Indoor
Risk management measures	
Technical conditions and	: Use in closed process, no likelihood of exposure
measures	Sample via a closed loop or other system to avoid exposure
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
	worker exposure: Industrial use (Use in closed, onal controlled exposure) (PROC2)
Product characteristics	400.04
Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use)	: Low volatile liquid
Vapour pressure	: 0,123 hPa
Frequency and duration of use	
Exposure duration	: <= 480 min
Frequency of use	: <= 240 days per year
Human factors not influenced by ris	
Dermal exposure Exposed skin surface assumed	: Palm of both hands : 480 cm <sup>2</sup>
Other operational conditions affecti	•
Outdoor / Indoor	: Indoor
Risk management measures	
Note	: Use in closed, continuous process with occasional controlle
	exposure
	No specific measures identified.
Additional good practice advice bey Additional good practice advice	<pre>vond the REACH Chemical Safety Assessment   : Wear solely goggles.</pre>
	worker exposure: Industrial use (Use in closed batch
	on), Use in batch and other process (synthesis) where
	on), Use in batch and other process (synthes

Product characteristics Concentration of the Substance in : <= 100 %

Mixture/Article



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Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use			
Exposure duration	: <= 480 min		
Frequency of use	: <= 240 days per year		
Human factors not influenced by ris	sk management		
Dermal exposure	: Palm of one hand		
Exposed skin surface assumed	: 240 cm <sup>2</sup>		
Remarks	: Use in closed batch process (synthesis or formulation)		
Dermal exposure	: Palm of both hands		
Exposed skin surface assumed	: 480 cm <sup>2</sup>		
Remarks	: Use in batch and other process (synthesis) where opportunity for exposure arises		
Other operational conditions affecting workers exposure			
Outdoor / Indoor	: Indoor		
Risk management measures			
Technical conditions and measures	: Use in closed batch process (synthesis or formulation)		
Note	: Use in batch and other process (synthesis) where opportunity for exposure arises		
	No specific measures identified.		
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.			
24.2.5 ES 24 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in			

# 24.2.5 ES 24 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use			
Exposure duration	: <= 480 min		
Frequency of use	: <= 240 days per year		
Human factors not influenced by risk management			
Dermal exposure Exposed skin surface assumed	<ul> <li>Palm of both hands</li> <li>480 cm<sup>2</sup></li> </ul>		

#### Other operational conditions affecting workers exposure Outdoor / Indoor : Indoor



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Risk management measures		
Exposure routes	: Dermal exposure	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in	
·	combination with specific activity training.	
Effectiveness (of a measure)	: 90 %	
Additional good practice advice bey	ond the REACH Chemical Safety Assessment	
Additional good practice advice		
24.2.6 ES 24 - CS 6: Control of vindustrial settings and application	worker exposure: Industrial use (Spraying in ons) (PROC7)	
Product characteristics		
Concentration of the Substance in	: <= 100 %	
Mixture/Article		
Physical Form (at time of use)	: Low volatile liquid	
Vapour pressure	: 0,123 hPa	
Amount used		
Amounts used	: 0,6 L/min	
Frequency and duration of use		
Exposure duration	: 360 min	
Frequency of use	: <= 5 days per week	
Human factors not influenced by ris	sk management	
Dermal exposure	: Whole body	
Other operational conditions affecti	ng workers exposure	
Outdoor / Indoor	: Indoor	
Room size	: > 1000 m3	
Diek meneroment mesoures		
Risk management measures	Least avecuat ventilation	
Technical conditions and measures	: Local exhaust ventilation	
Effectiveness (of a measure)	: 50 %	
Note	: Ensure that the direction of airflow is clearly away from the	he
	worker.	
Personal protective measures	: Wear chemically resistant gloves (tested to EN374) in	
	combination with 'basic' employee training.	
Effectiveness (of a measure)	: 90 %	
Personal protective measures	: Wear suitable working clothes.	
·	Wear suitable coveralls to prevent exposure to the skin.	
Effectiveness (of a measure)	: 80 %	
Organisational measures to	: Ensure that the distance from worker to task is greater the	nar
prevent /limit releases, dispersion and exposure	m.	
Organisational measures to	: Ensure that direction of application is only horizontal or	
organisational measures to		



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prevent /limit releases, dispersion and exposure	downward.
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	: Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	: Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

# 24.2.7 ES 24 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %		
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa		
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year		
Human factors not influenced by risk	x management		
Dermal exposure	: Both hands		
Exposed skin surface assumed	: 960 cm <sup>2</sup>		
Other operational conditions affecting workers exposure			
Outdoor / Indoor	: Indoor		
Risk management measures			
Exposure routes	: Inhalation exposure		
Technical conditions and measures	: Local exhaust ventilation		
Effectiveness (of a measure)	: 90 %		
	: If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.		
Effectiveness (of a measure)	: 90 %		

Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.

#### 24.2.8 ES 24 - CS 8: Control of worker exposure: Industrial use (Transfer of



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	ing/discharging) from/to vessels/large containers at substance or preparation into small containers weighing)) (PROC8b, PROC9)
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands
Other operational conditions affecti Outdoor / Indoor	
Risk management measures Note	: No specific measures identified.
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.
24.2.9 ES 24 - CS 9: Control of v brushing) (PROC10)	worker exposure: Industrial use (Roller application or
Product characteristics Concentration of the Substance in Mixture/Article	: <= 100 %
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	sk management : Both hands : 960 cm <sup>2</sup>
Other operational conditions affecti Outdoor / Indoor	ng workers exposure : Indoor
<b>Risk management measures</b> Exposure routes Personal protective measures	: Dermal exposure : Wear chemically resistant gloves (tested to EN374) in



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Effectiveness (of a measure)	combination with 'basic' employee training. : 90 % yond the REACH Chemical Safety Assessment	
Additional good practice advice		
24.2.10 ES 24 - CS 10: Control of articles by dipping and pouring)	of worker exposure: Industrial use (Treatment of (PROC13)	
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use		
Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands	
Other operational conditions affection outdoor / Indoor	i <b>ng workers exposure</b> : Indoor	
<b>Risk management measures</b> Exposure routes Personal protective measures Effectiveness (of a measure)	<ul> <li>Dermal exposure</li> <li>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</li> <li>90 %</li> </ul>	
Additional good practice advice bey Additional good practice advice	yond the REACH Chemical Safety Assessment : Wear solely goggles.	
24.2.11 ES 24 - CS 11: Control of worker exposure: Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC14)		
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Frequency and duration of use Exposure duration Frequency of use	: <= 480 min : <= 240 days per year	
Human factors not influenced by ris Dermal exposure Exposed skin surface assumed	: Palm of both hands	



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	2 and at printing 2 and 1	
Other operational conditions affectir	na workers exposure	
Outdoor / Indoor	: Indoor	
Risk management measures Note	: No specific measures identified.	
Additional good practice advice beyon Additional good practice advice	ond the REACH Chemical Safety Assessment : Wear solely goggles.	
24.2.12 ES 24 - CS 12: Control o reagent) (PROC15)	f worker exposure: Industrial use (Use as laboratory	
<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 100 %	
Physical Form (at time of use) Vapour pressure	: Low volatile liquid : 0,123 hPa	
Amount used Storage	: <1 kg, < 1 l	
Frequency and duration of use Exposure duration	: <= 480 min	
Frequency of use	: <= 240 days per year	
Human factors not influenced by risl	k management	
Dermal exposure	: Palm of both hands	
Exposed skin surface assumed		
Other operational conditions affectir Outdoor / Indoor	ig workers exposure : Indoor	
Risk management measures		
Note	: Use as laboratory reagent	
	No specific measures identified.	
Additional good practice advice beyond the REACH Chemical Safety Assessment Additional good practice advice : Wear solely goggles.		

### 24.3. ES 24 Exposure estimation and reference to its source

24.3.2 ES 24 - CS 2: Worker exposure: Industrial use (Use in closed process, no likelihood of exposure) (PROC1)

Route of exposure and type	Exposure estimate	RCR
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of effects		
Worker - inhalative, long-term - local and systemic	0,03 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,004

### 24.3.3 ES 24 - CS 3: Worker exposure: Industrial use (Use in closed, continuous process with occasional controlled exposure) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,08

# 24.3.4 ES 24 - CS 4: Worker exposure: Industrial use (Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation))	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in closed batch process (synthesis or formulation)	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises)	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Use in batch and other process (synthesis) where opportunity for exposure arises	0,43

24.3.5 ES 24 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)) (PROC5)



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Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,38

### 24.3.6 ES 24 - CS 6: Worker exposure: Industrial use (Spraying in industrial settings and applications) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m <sup>3</sup> (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
Human health (combined for all exposure routes)	Not applicable	0,80

# 24.3.7 ES 24 - CS 7: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,13
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,20

# 24.3.8 ES 24 - CS 8: Worker exposure: Industrial use (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation	0,06



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	(charging/discharging) from/to vessels/large containers at dedicated facilities)	
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing))	0,06
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,43

### 24.3.9 ES 24 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,77

### 24.3.10 ES 24 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,01
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,75

### 24.3.11 ES 24 - CS 11: Worker exposure: Industrial use (Production of preparations or articles by tabletting, compression, extrusion, pelettisation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,03



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Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,40

### 24.3.12 ES 24 - CS 12: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m <sup>3</sup> (ECETOC TRA v2.0 worker; modified version)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA v2.0 worker; modified version)	0,003
Human health (combined for all exposure routes)	ECETOC TRA v2.0 worker; modified version	0,37

### 24.4. ES 24 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2

### 25. ES 25: Consumer use; Insulation foams

#### 25.1. Titles of Contributing scenarios (CS)

Polymer preparations and compounds (PC32) Environment		
CS1: Consumer use (Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix)	ERC8c, ERC8f	
Consumer		
CS2: Consumer use (Polymer preparations and compounds)	PC32	

#### 25.2. ES 25 Conditions of use affecting exposure

25.2.1 ES 25 - CS 1: Control of environmental exposure: Consumer use (Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix) (ERC8c, ERC8f)

Remarks

: As no environmental hazard was identified no environmentalrelated exposure assessment and risk characterization was performed.



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The use is assessed to be safe.

### 25.2.2 ES 25 - CS 2: Control of consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

<b>Product characteristics</b> Concentration of the Substance in Mixture/Article	: <= 5 %			
Physical Form (at time of use) Vapour pressure	: Liquid : 0,123 hPa			
Amount used Amount per use	: 0,825 kg			
Frequency and duration of use Exposure duration Frequency of use	: 30 min : 0,2 days per year			
Human factors not influenced by risk managementExposed skin surface assumed: 1900 cm²Breathing volume: 1,5 m3/day				
Other given operational conditions a	affecting consumers exposure			
Outdoor / Indoor	: Indoor			
Room size Temperature	: 57,5 m3 : 25 ℃			
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)				

Consumer Measures

: No specific measures identified.

#### 25.3. ES 25 Exposure estimation and reference to its source

25.3.2 ES 25 - CS 2: Consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-	0,06 mg/m <sup>3</sup> (ConsExpo v4.1)	0,009



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term - local and systemic		
	0,007 mg/kg bw/day (ConsExpo v4.1)	0,0008
- systemic		
Consumer - oral, long-term -	Not applicable	
systemic		
Human health (combined for	ConsExpo v4.1	0,01
all exposure routes)		

### 25.4. ES 25 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users Section 2