

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

- Trade name RHODIAMINE HMD 60%
- REACH : Registration number 01-2119473981-28-0000

1.2 Relevant identified uses of the substance or mixture and uses advised against**Uses of the Substance/Mixture**

- Industrial Manufacturing (all)
- Manufacture of textiles, leather, fur
- Manufacture of bulk, large scale chemicals (including petroleum products)
- Manufacture of fine chemicals
- Formulation
- Manufacture of rubber products
- Manufacture of plastics products, including compounding and conversion

- Use as intermediate or monomer
- Formulation & (re)packing of substances and mixtures
- Use in liquid formulation
- Use in dry formulation
- (for more details please refer to the annex of this SDS)

1.3 Details of the supplier of the safety data sheet**Company**

RHODIA Opérations
Avenue Ramboz
69192 Saint Fons Cedex - France
Tel : +33 (0)4.72.89.27.00

E-mail address

manager.sds@solvay.com

1.4 Emergency telephone number

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

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****Classification (Regulation (EC) No 1272/2008)**

Acute toxicity, Category 4	H302: Harmful if swallowed.
Acute toxicity, Category 4	H312: Harmful in contact with skin.
Skin corrosion, Category 1B	H314: Causes severe skin burns and eye damage.
Serious eye damage, Category 1	H318: Causes serious eye damage.
Specific target organ toxicity - single exposure, Category 3	H335: May cause respiratory irritation. (Respiratory system)

2.2 Label elements**Regulation (EC) No 1272/2008****Hazardous products which must be listed on the label**

- Index-No. 612-104-00-9 hexamethylenediamine

SECTION 4: First aid measures**4.1 Description of first aid measures****General advice**

- Show this safety data sheet to the doctor in attendance.
- First aider needs to protect himself.
- Place affected clothing in a sealed bag for subsequent decontamination.

In case of inhalation

- Move to fresh air.
- Keep at rest.
- Get immediate medical advice/ attention.

In case of skin contact

- Take off contaminated clothing and shoes immediately.
- Wash immediately and thoroughly for a prolonged period (at least 15 minutes).
- Get immediate medical advice/ attention.

In case of eye contact

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Get immediate medical advice/ attention.

In case of ingestion

- Do NOT induce vomiting.
- Do not give anything to drink.
- Get immediate medical advice/ attention.

4.2 Most important symptoms and effects, both acute and delayed

- no data available

4.3 Indication of any immediate medical attention and special treatment needed

- no data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

- Water spray

Unsuitable extinguishing media

- Carbon dioxide (CO₂)

5.2 Special hazards arising from the substance or mixture**Specific hazards during firefighting**

- On heating there is a risk of a build-up of pressure in hermetically sealed containers or tanks.
- Highly toxic gases are released.

Hazardous combustion products:

- Hydrogen cyanide (hydrocyanic acid)
- Ammonia
- Nitrogen oxides (NO_x)
- Carbon oxides

5.3 Advice for firefighters

Special protective equipment for firefighters

- Self-contained breathing apparatus (EN 133)
- Special protective equipment for firefighters

Specific fire fighting methods

- Cool containers/tanks with water spray.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

- Avoid contact with the skin and the eyes.
- Personal protective equipment
- Self-contained breathing apparatus (EN 133)
- Wear suitable gloves.
- Tightly fitting safety goggles
- Boots

6.2 Environmental precautions

- Dam up.
- The product should not be allowed to enter drains, water courses or the soil.

6.3 Methods and materials for containment and cleaning up***Recovery***

- Collect spillage.
- Keep in properly labelled containers.

Decontamination/cleaning

- Wash off with plenty of water.
- Recover the cleaning water for subsequent disposal.

Disposal

- Treat recovered material as described in the section "Disposal considerations".

6.4 Reference to other sections

- Refer to protective measures listed in sections 7 and 8.
- 13. DISPOSAL CONSIDERATIONS

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

- Vapour extraction at source
- Do not allow contact with air.
- Use only in well-ventilated areas.
- Avoid contact with skin and eyes.
- Do not breathe vapours/dust.

Hygiene measures

- Emergency equipment immediately accessible, with instructions for use.
- Ensure that eyewash stations and safety showers are close to the workstation location.
- Use clean, well-maintained personal protection equipment.
- Wash hands before breaks and immediately after handling the product.
- When using do not eat, drink or smoke.

- Wash hands before breaks and immediately after handling the product.
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7.2 Conditions for safe storage, including any incompatibilities**Technical measures/Storage conditions**

- Keep away from open flames, hot surfaces and sources of ignition.
- Keep away from incompatible materials to be indicated by the manufacturer
- Keep under inert gas.
- Keep in a well-ventilated place.

- Keep away from: Acids, Oxidizing materials.

Packaging material**Suitable material**

- Stainless steel
- Plastic materials (polyethylene).

Remarks

- Drum
- Intermediate Bulk Container (IBC)

7.3 Specific end use(s)

- no data available

SECTION 8: Exposure controls/personal protection**8.1 Control parameters****Components with workplace occupational exposure limits**

Components	Value type	Value	Basis
hexamethylenediamine	TWA	0.5 ppm	USA. ACGIH Threshold Limit Values (TLV)

RHODIAMINE HMD 60%

Revision Date 25.07.2017

Derived No Effect Level (DNEL) / Derived minimal effect level (DMEL)

Product name	Population	Route of exposure	Potential health effects	Exposure time	Value	Remarks
hexamethylenediamine	Workers	Inhalation	Local effects	Acute	1.62 mg/m ³	
	Workers	Inhalation	Local effects	Long term	0.54 mg/m ³	
	General population	Inhalation	Local effects	Acute	1.2 mg/m ³	
	General population	Inhalation	Local effects	Long term	0.4 mg/m ³	
	General population	Oral	Systemic effects	Long term	0.56 mg/kg bw/day	

Predicted No Effect Concentration (PNEC)

Product name	Compartment	Value	Remarks
hexamethylenediamine	Fresh water	0.42 mg/l	
	Marine water	0.04 mg/l	
	Intermittent use/release	0.32 mg/l	
	Fresh water sediment	65.35 mg/kg (dw)	Derived with the Equilibrium Partitioning Method.
	Marine sediment	6.54 mg/kg (dw)	Derived with the Equilibrium Partitioning Method.
	Soil	3.52 mg/kg (dw)	
	STP	29.1 mg/l	
	Oral (secondary poisoning)		No PNEC derivation as there is no potential for bioaccumulation.

8.2 Exposure controls**Control measures****Engineering measures**

- Use only in well-ventilated areas.
- Effective exhaust ventilation system
- Avoid splashes.

Individual protection measures**Respiratory protection**

- In case of insufficient ventilation, wear suitable respiratory equipment.
- Respirator with a vapour filter (EN 141)

Hand protection

- Where there is a risk of contact with hands, use appropriate gloves
- The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
- Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Suitable material

- Nitrile rubber

PRCO90054497

Version : 12.00 / GB (EN)

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- Break through time: \geq 8 h
- Glove thickness: 0.35 mm

- butyl-rubber
- Break through time: \geq 8 h
- Glove thickness: 0.5 mm

- Fluorinated rubber
- Break through time: \geq 8 h
- Glove thickness: 0.4 mm

- Natural Rubber
- Break through time: \leq 4 h
- Glove thickness: 0.5 mm

- Latex gloves
- Break through time: \leq 4 h
- Glove thickness: 0.5 mm

Eye protection

- Tightly fitting safety goggles

Skin and body protection

- In case of contact through splashing:
- Complete suit protecting against chemicals
- Complete head face and neck protection

- Remove and wash contaminated clothing.

Hygiene measures

- Emergency equipment immediately accessible, with instructions for use.
- Ensure that eyewash stations and safety showers are close to the workstation location.
- Use clean, well-maintained personal protection equipment.
- Wash hands before breaks and immediately after handling the product.
- When using do not eat, drink or smoke.

- Wash hands before breaks and immediately after handling the product.
- When using do not eat, drink or smoke.

Protective measures

- Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the potential hazards and/or risks that may occur during use.

Environmental exposure controls

- Dam up.
- The product should not be allowed to enter drains, water courses or the soil.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties****Appearance**

Form: Aqueous solution
Physical state: liquid
Colour: colourless

Odour

ammoniacal

<u>Odour Threshold</u>	no data available
<u>Molecular weight</u>	116.21 g/mol Anhydrous product
<u>pH</u>	12.1 (1 % (m/v)) Aqueous solution
<u>Melting point/freezing point</u>	-9 °C
<u>Initial boiling point and boiling range</u>	<u>Boiling point/boiling range:</u> 107 °C (1,013 hPa)
<u>Flash point</u>	> 98 °C closed cup Molten form, internal evaluation
<u>Evaporation rate (Butylacetate = 1)</u>	no data available
<u>Flammability (solid, gas)</u>	The product is not flammable. Method: EU Test Guideline A10 internal evaluation
<u>Flammability (liquids)</u>	The product is not flammable. Molten form
<u>Flammability/Explosive limit</u>	no data available
<u>Auto-ignition temperature</u>	315 °C (1,027 hPa) Method: EU Test Guideline A15 Anhydrous product
<u>Vapour pressure</u>	61 hPa (40 °C)
<u>Vapour density</u>	no data available
<u>Density</u>	0.945 kg/m ³ (20 °C)
<u>Relative density</u>	no data available
<u>Solubility</u>	<u>Water solubility:</u> 1,285 g/l (20 °C) <u>Solubility in other solvents:</u> Diethylether : slightly soluble Benzene : slightly soluble Methanol : 1,120 g/l (20 °C) soluble
<u>Partition coefficient: n-octanol/water</u>	log Pow: 0.02 - 0.35
<u>Decomposition temperature</u>	no data available
<u>Viscosity</u>	no data available
<u>Explosive properties</u>	Not explosive Method : EU Test Guideline A14 pure product

Oxidizing properties

Not considered as oxidizing, Structure-activity relationship (SAR)

9.2 Other information

no data available

SECTION 10: Stability and reactivity**10.1 Reactivity**

- no data available

10.2 Chemical stability

- Stable under normal conditions.

10.3 Possibility of hazardous reactions

- Reacts slowly with carbon dioxide present in the air.

10.4 Conditions to avoid

- no data available

10.5 Incompatible materials

- Reacts violently with:
- Strong acids
- Oxidizing agents

10.6 Hazardous decomposition products

- On thermal decomposition (pyrolysis) releases:
- highly toxic gases.
- Hydrogen cyanide (hydrocyanic acid)
- Ammonia gas may be liberated at high temperatures.

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity****Acute oral toxicity**

hexamethylenediamine

LD50 : 1,160 mg/kg - Rat , male and female

Method: according to a standardised method

This product is classified as acute toxicity, category 4

Unpublished internal reports

Acute inhalation toxicity

no data available

Acute dermal toxicity

This product is classified as acute toxicity, category 4

According to the available data on the components

Expert judgement

Acute toxicity (other routes of administration)

no data available

Skin corrosion/irritation

hexamethylenediamine

Causes burns.
Method: according to a standardised method
Unpublished reports
Unpublished internal reports

Serious eye damage/eye irritation

hexamethylenediamine

Rabbit
Risk of serious damage to eyes.
Method: according to a standardised method
Unpublished reports

Respiratory or skin sensitisation

hexamethylenediamine

Corrosive

Mutagenicity**Genotoxicity in vitro**

hexamethylenediamine

Ames test
with and without metabolic activation

negative
Method: OECD Test Guideline 471
Unpublished internal reports

Chromosome aberration test in vitro
Strain: Chinese hamster ovary cells
with and without metabolic activation

negative
Method: OECD Test Guideline 473
Published data

Gene mutation assays in mammalian cells.
Strain: Chinese hamster ovary cells
with and without metabolic activation

negative
Method: OECD Test Guideline 476
Unpublished reports

Genotoxicity in vivo

hexamethylenediamine

Chromosome aberration test in vivo - Rat
male and female
Oral
Method: OECD Test Guideline 475

negative
Unpublished internal reports

Carcinogenicity

no data available

Toxicity for reproduction and development**Toxicity to reproduction/Fertility**

hexamethylenediamine

Two-generation study - Rat, male and female
 Oral
 General Toxicity - Parent NOAEL: 500 mg/kg bw/day
 OECD Test Guideline 416
 No toxicity to reproduction, Published data

Developmental Toxicity/Teratogenicity

hexamethylenediamine

Oral
 General Toxicity Maternal NOAEL: 184 mg/kg bw/day
 Teratogenicity NOAEL:300mg/kg bw/day
 OECD Test Guideline 414
 Published data, no embryotoxic or teratogenic effects have been observed

Oral
 General Toxicity Maternal NOAEL: 25 mg/kg
 Teratogenicity NOAEL:50mg/kg
 OECD Test Guideline 414
 Published data, no embryotoxic or teratogenic effects have been observed

STOT**STOT - single exposure**

hexamethylenediamine

Target Organs: Respiratory system
 The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation according to GHS criteria.

STOT - repeated exposure

hexamethylenediamine

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

hexamethylenediamine

Inhalation 90 Days - Rat
 NOAEL: 0.01 mg/l
 Published data

Oral 14 Days - Rat
 NOAEL: 390 mg/kg
 Published data

Experience with human exposure**Experience with human exposure : Inhalation**

hexamethylenediamine

Irritating to respiratory system.

Aspiration toxicity

no data available

SECTION 12: Ecological information**12.1 Toxicity****Aquatic Compartment****Acute toxicity to fish**

hexamethylenediamine

LC50 - 96 h : 1,825 mg/l - Pimephales promelas (fathead minnow)
static test
Analytical monitoring: no

Method: OECD Test Guideline 203
Unpublished reports
Not harmful to fish (LC/LL50 > 100 mg/L)

Acute toxicity to daphnia and other aquatic invertebrates.

hexamethylenediamine

EC50 - 48 h : 31.5 mg/l - Daphnia magna (Water flea)
static test
Analytical monitoring: no

Method: according to a standardised method
Unpublished reports
Harmful to aquatic invertebrates.

Toxicity to aquatic plants

hexamethylenediamine

ErC50 - 72 h : > 100 mg/l - Pseudokirchneriella subcapitata (microalgae)
static test

Analytical monitoring: yes
End point: Growth rate
Method: OECD Test Guideline 201
Not harmful to algae (EC/EL50 > 100 mg/L)
Unpublished internal reports

ErC10 - 72 h : 118 mg/l - Pseudokirchneriella subcapitata (microalgae)
static test

Analytical monitoring: yes
End point: Growth rate
Method: OECD Test Guideline 201
No adverse chronic effect observed up to and including the threshold of 1 mg/L.
Unpublished internal reports

Toxicity to microorganisms

hexamethylenediamine

EC50 - 3 h : 291 mg/l - activated sludge
static test

Method: OECD Test Guideline 209
Unpublished internal reports

Chronic toxicity to fish

no data available

Chronic toxicity to daphnia and other aquatic invertebrates.

hexamethylenediamine

NOEC: 4.2 mg/l - 21 Days - Daphnia magna (Water flea)
semi-static test

Analytical monitoring: yes
Method: OECD Test Guideline 211
No adverse chronic effect observed up to and including the threshold of 1 mg/L.
Published data

Chronic Toxicity to aquatic plants no data available

Terrestrial Compartment

Toxicity to soil dwelling organisms

hexamethylenediamine

EC10: 176.1 mg/kg - 56 Days - Eisenia fetida (earthworms)
End point: Reproduction
Method: OECD Test Guideline 222
Unpublished internal reports

IC10: > 1,000 mg/kg - 28 Days - soil micro-organisms
End point: Nitrogen transformation
Method: OECD Test Guideline 216
Unpublished internal reports

12.2 Persistence and degradability

Abiotic degradation

no data available

Physical- and photo-chemical elimination

no data available

Biodegradation

Biodegradability

hexamethylenediamine

Ready biodegradability study:
Method: OECD Test Guideline 301 D
82 % - 28 Days
The 10 day time window criterion is fulfilled.
The substance fulfills the criteria for ultimate aerobic biodegradability and ready biodegradability
O2 consumption
Inoculum: activated sludge
Unpublished internal reports

Degradability assessment

hexamethylenediamine

The product is considered to be rapidly degradable in the environment

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

hexamethylenediamine

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

Bioconcentration factor (BCF)

no data available

12.4 Mobility in soil**Adsorption potential (Koc)**

hexamethylenediamine

Adsorption

Soil

Log Koc: 4.23

Method: OECD Test Guideline 106

Unpublished internal reports

Adsorption

Sediment

Log Koc: 3.18

Method: OECD Test Guideline 106

Unpublished internal reports

Known distribution to environmental compartments

hexamethylenediamine

Ultimate destination of the product : Water

Method: Estimation method / Structure-activity relationship (SAR)

12.5 Results of PBT and vPvB assessment

hexamethylenediamine

Not classified as PBT substance.

Not classified as vPvB.

12.6 Other adverse effects**Ecotoxicity assessment****Acute aquatic toxicity**

hexamethylenediamine

Harmful to aquatic life.

Chronic aquatic toxicity

hexamethylenediamine

No adverse chronic effect observed up to and including the threshold of 1 mg/L.

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product Disposal*****Prohibition***

- Avoid release to the environment.
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.

Advice on cleaning and disposal of packaging

- Clean with cold water.
- Reuse or recycle following washing.
- Dispose of as hazardous waste in compliance with local and national regulations.

Measure for waste avoidance or recovery

- Do not dispose of the product at a rubbish tip.

SECTION 14: Transport information**ADR**

14.1 UN number	UN 1783
14.2 Proper shipping name	HEXAMETHYLENEDIAMINE SOLUTION
14.3 Transport hazard class	8
Label(s):	8
14.4 Packing group	
Packing group	II
Classification Code	C7
14.5 Environmental hazards	NO
14.6 Special precautions for user	
Hazard Identification Number:	80
Tunnel restriction code	(E)

For personal protection see section 8.

RID

14.1 UN number	UN 1783
14.2 Proper shipping name	HEXAMETHYLENEDIAMINE SOLUTION
14.3 Transport hazard class	8
Label(s):	8
14.4 Packing group	
Packing group	II
Classification Code	C7
14.5 Environmental hazards	NO
14.6 Special precautions for user	
Hazard Identification Number:	80

For personal protection see section 8.

IMDG

14.1 UN number	UN 1783
14.2 Proper shipping name	HEXAMETHYLENEDIAMINE SOLUTION
IMDG Code segregation group	Alkalis
14.3 Transport hazard class	8
Label(s):	8
14.4 Packing group	
Packing group	II
14.5 Environmental hazards	NO
Marine pollutant	
14.6 Special precautions for user	
EmS	F-A , S-B

For personal protection see section 8.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
no data available

IATA

14.1 UN number	UN 1783
14.2 Proper shipping name	HEXAMETHYLENEDIAMINE SOLUTION
14.3 Transport hazard class	8
Label(s):	8
14.4 Packing group	
Packing group	II
14.5 Environmental hazards	NO
14.6 Special precautions for user	
Packing instruction (cargo aircraft)	855
Max net qty/pkg	30.00 L
Packing instruction (passenger aircraft)	851
Max net qty/pkg	1.00 L

For personal protection see section 8.

ADN

14.1 UN number	UN 1783
14.2 Proper shipping name	HEXAMETHYLENEDIAMINE SOLUTION
14.3 Transport hazard class	8
Label(s):	8
14.4 Packing group	
Packing group	II
Classification Code	C7
14.5 Environmental hazards	NO
14.6 Special precautions for user	
Hazard Identification Number:	80

For personal protection see section 8.

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

SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

- According to our knowledge, no specific regulatory information.

15.2 Chemical safety assessment

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

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

- H302 Harmful if swallowed.
- H312 Harmful in contact with skin.
- H314 Causes severe skin burns and eye damage.
- H318 Causes serious eye damage.
- H335 May cause respiratory irritation.

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

- TWA 8-hour, time-weighted average

Further information

- This sheet was updated (refer to the date at the top of this page). Subheadings and text which have been modified since the previous version are indicated with two vertical bars.

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

Annex

Scenario List

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1. ES1 : Industrial use for nylon salt production (very large customers)

1.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
		SU12	Manufacture of plastics products, including compounding and conversion
Environmental release category	:	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Process category	:	PROC1	Use in closed process, no likelihood of exposure
		PROC2	Use in closed, continuous process with occasional controlled exposure
		PROC3	Use in closed batch process (synthesis or formulation)
		PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
		PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
		PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
		PROC15	Use as laboratory reagent
Product category	:	PC32	Polymer preparations and compounds

1.2. Conditions of use affecting exposure

1.2.1 Contributing scenario controlling environmental exposure for: ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

Amount

Annual site tonnage (tonnes/year):	:	50000
Maximum daily site tonnage (kg/day):	:	166667
Emission Days (days/year):	:	300

Environmental factors

Flow rate	:	390,000 m3/d
Dilution Factor (River)	:	40
Dilution Factor (Coastal Areas)	:	100

PRCO90054497

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Other given operational conditions affecting environmental exposure

Continuous release.
 Emission or Release Factor: Air : 0.1 %
 Emission or Release Factor: Water : 0.7 %
 Emission or Release Factor: Soil : 0.1 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant : Onsite sewage treatment plant
 Flow rate of sewage treatment plant : 10,000 m3/d
 effluent
 Percentage removed from waste water : 87.85 %
 Sludge Treatment : Do not apply industrial sludge to natural soils.
 Remarks : European standard sewage treatment is assumed

1.2.2 Contributing scenario controlling worker exposure for: PROC1 Use in closed process, no likelihood of exposure**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle substance within a closed system.

1.2.3 Contributing scenario controlling worker exposure for: PROC2 Use in closed, continuous process with occasional controlled exposure, PROC3 Use in closed batch process (synthesis or formulation), PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

1.2.4 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product less than 1%.
Physical Form (at time of use)	: Liquid mixture
Vapour pressure	: 0.12 kPa
Process Temperature	: 40 °C

Frequency and duration of use

Exposure duration	: 4 h
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
------------------	-------------------

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

1.2.5 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 kPa
Process Temperature	: 80 °C

Frequency and duration of use

Exposure duration	: 30 min
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
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Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation., Sample via a closed loop or other system to avoid exposure.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.,

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Avoid splashing.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : If above technical/organisational control measures are not feasible, then adopt following PPE:, Respirator with a vapour filter (EN 141)

1.2.6 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities, AP0305 Loading of application equipment - transfer of material from one container to another - indoor, AP0401 Loading of application equipment - transfer of material from one container to another - outdoor

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

1.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 0.23 kPa
 Process Temperature : 50 °C

Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

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Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

1.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6a	Local PEC	Surface water	0.357 mg/L	0.85
		Fresh water sediment	55.5 mg/kg dry weight (d.w.)	0.85
		Agricultural soil	0.357 mg/kg dry weight (d.w.)	0.0982
		STP	14.2 mg/L	0.487
	Regional PEC	Fresh water	0.00336 mg/l	0.008
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine water	0.000336 mg/l	0.0084
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Air	0.0000141 mg/m ³	
		Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1		Inhalation - Long-term – local effects	0.01 mg/m ³	0.02
PROC2	with local exhaust ventilation	Inhalation - Long-term – local effects	0.2 mg/m ³	0.37
PROC3	with local exhaust ventilation	Inhalation - Long-term – local effects	0.058 mg/m ³	0.11
PROC4	with local exhaust ventilation	Inhalation - Long-term – local effects	0.36 mg/m ³	0.67
PROC8a	Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC8b	Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
	Indoor, Outdoor	Inhalation - Long-term – local effects	0.049 mg/m ³	0.09
PROC15	with local exhaust ventilation	Inhalation - Long-term – local effects	0.093 mg/m ³	0.17

RCR = Risk characterisation ratio

ERC6a Exposure Assessment Method : ECETOC TRA
 PROC1 Exposure Assessment Method : ECETOC TRA
 PROC2 Exposure Assessment Method : ART (Advanced Reach Tool)

PROC3	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC4	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC15	Exposure Assessment Method : ART (Advanced Reach Tool)

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

1.4.1 Environment

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

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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

1.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

2. ES2 : Industrial use for nylon salt production (large customers)

2.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
		SU12	Manufacture of plastics products, including compounding and conversion
Environmental release category	:	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Process category	:	PROC1	Use in closed process, no likelihood of exposure
		PROC2	Use in closed, continuous process with occasional controlled exposure
		PROC3	Use in closed batch process (synthesis or formulation)
		PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
		PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
		PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
		PROC15	Use as laboratory reagent
Product category	:	PC32	Polymer preparations and compounds

2.2. Conditions of use affecting exposure

2.2.1 Contributing scenario controlling environmental exposure for: ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

Amount

Annual site tonnage (tonnes/year):	:	10000
Maximum daily site tonnage (kg/day):	:	33333
Emission Days (days/year):	:	300

Environmental factors

Flow rate	:	390,000 m ³ /d
Dilution Factor (River)	:	40
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous release.	
Emission or Release Factor: Air	: 0.1 %
Emission or Release Factor: Water	: 0.7 %
Emission or Release Factor: Soil	: 0.1 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Flow rate of sewage treatment plant effluent	:	10,000 m ³ /d
Percentage removed from waste water	:	87.85 %
Sludge Treatment	:	Do not apply industrial sludge to natural soils.
Remarks	:	European standard sewage treatment is assumed

2.2.2 Contributing scenario controlling worker exposure for: PROC1 Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
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Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle substance within a closed system.

2.2.3 Contributing scenario controlling worker exposure for: PROC2 Use in closed, continuous process with occasional controlled exposure, PROC3 Use in closed batch process (synthesis or formulation), PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

2.2.4 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product less than 1%.
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.12 kPa
 Process Temperature : 40 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

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Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

2.2.5 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 kPa
Process Temperature	: 80 °C

Frequency and duration of use

Exposure duration	: 30 min
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation., Sample via a closed loop or other system to avoid exposure.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed., Avoid splashing.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	: If above technical/organisational control measures are not feasible, then adopt following PPE:, Respirator with a vapour filter (EN 141)
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2.2.6 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities, AP0305 Loading of application equipment - transfer of material from one container to another - indoor, AP0401 Loading of application equipment - transfer of material from one container to another - outdoor**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance

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Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

2.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 0.23 kPa
 Process Temperature : 50 °C

Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

2.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6a	Local PEC	Surface water	0.074 mg/L	0.176
		Fresh water sediment	11.5 mg/kg dry weight (d.w.)	0.176
		Marine water	0.0286 mg/l	0.715
		Marine sediment	4.45 mg/kg dry weight (d.w.)	0.681
		STP	2.83 mg/L	0.0974
	Regional PEC	Agricultural soil	0.2 mg/kg dry weight (d.w.)	0.0535
		Fresh water	0.00336 mg/l	0.008
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine water	0.000336 mg/l	0.0084
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Air	0.0000141 mg/m ³	
		Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1		Inhalation - Long-term – local effects	0.01 mg/m ³	0.02
PROC2	with local exhaust ventilation	Inhalation - Long-term – local effects	0.2 mg/m ³	0.37
PROC3	with local exhaust ventilation	Inhalation - Long-term – local effects	0.058 mg/m ³	0.11
PROC4	with local exhaust ventilation	Inhalation - Long-term – local effects	0.36 mg/m ³	0.67
PROC8a	Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC8b	Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
	Indoor, Outdoor	Inhalation - Long-term – local effects	0.049 mg/m ³	0.09
PROC15	with local exhaust ventilation	Inhalation - Long-term – local effects	0.093 mg/m ³	0.17

RCR = Risk characterisation ratio

ERC6a	Exposure Assessment Method : ECETOC TRA
PROC1	Exposure Assessment Method : ECETOC TRA
PROC2	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC3	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC4	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC15	Exposure Assessment Method : ART (Advanced Reach Tool)

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

2.4.1 Environment

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

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

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

2.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

3. ES3 : Industrial use as an intermediate in HDI manufacture in a dry process

3.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
		SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
		SU9	Manufacture of fine chemicals
Environmental release category	:	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Process category	:	PROC1	Use in closed process, no likelihood of exposure
		PROC2	Use in closed, continuous process with occasional controlled exposure
		PROC3	Use in closed batch process (synthesis or formulation)
		PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
		PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
		PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
		PROC15	Use as laboratory reagent
Product category	:	PC19	Intermediate

3.2. Conditions of use affecting exposure

3.2.1 Contributing scenario controlling environmental exposure for: ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

Amount

Annual site tonnage (tonnes/year):	:	75000
Maximum daily site tonnage (kg/day):	:	250000
Emission Days (days/year):	:	300

Environmental factors

Flow rate	:	390,000 m ³ /d
Dilution Factor (River)	:	40
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous release.	
Emission or Release Factor: Air	: 0.1 %
Emission or Release Factor: Water	: 0 %
Emission or Release Factor: Soil	: 0.1 %

Technical conditions and measures / Organizational measures

Water	:	Use a process that does not generate aqueous waste water.
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Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Effectiveness (of a measure)	:	87.85 %
Sludge Treatment	:	Do not apply industrial sludge to natural soils.
Remarks	:	European standard sewage treatment is assumed

3.2.2 Contributing scenario controlling worker exposure for: PROC1 Use in closed process, no likelihood of exposure

Product characteristics

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Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 - 4.8 kPa
Process Temperature	: 80 - 110 °C

Frequency and duration of use

Exposure duration	: > 4 h
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
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Technical conditions and measures

Industrial use Handle substance within a closed system.

3.2.3 Contributing scenario controlling worker exposure for: PROC2 Use in closed, continuous process with occasional controlled exposure, PROC3 Use in closed batch process (synthesis or formulation), PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 - 4.8 kPa
Process Temperature	: 80 - 110 °C

Frequency and duration of use

Exposure duration	: 8 h
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
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Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

3.2.4 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product less than 1%.
Physical Form (at time of use)	: Liquid mixture
Vapour pressure	: 0.12 kPa
Process Temperature	: 40 °C

Frequency and duration of use

Exposure duration	: 4 h
Frequency of use	: <= 240 days/year

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Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

3.2.5 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 30 min
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation., Sample via a closed loop or other system to avoid exposure.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed., Avoid splashing.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : If above technical/organisational control measures are not feasible, then adopt following PPE:, Respirator with a vapour filter (EN 141)

3.2.6 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, AP0305 Loading of application equipment - transfer of material from one container to another - indoor, AP0401 Loading of application equipment - transfer of material from one container to another - outdoor**Product characteristics**

Concentration of the Substance in : Covers the percentage of the substance in the product up to 100 %

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Mixture/Article (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

3.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 0.23 kPa
 Process Temperature : 50 °C

Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

3.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6a	Local PEC	Surface water	0.00335 mg/L	0.00798
		Fresh water sediment	0.522 mg/kg dry weight (d.w.)	0.00798
		Marine water	0.000335 mg/L	0.0084
		Marine sediment	0.0522 mg/kg dry weight (d.w.)	0.0080
		STP	0 mg/l	0
		Agricultural soil	0.456 mg/kg dry weight (d.w.)	0.126
	Regional PEC	Surface water	0.00336 mg/L	0.0080
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine water	0.000336 mg/L	0.0084
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Air	0.0000141 mg/m ³	
		Agricultural soil	0.08 mg/kg (dw)	0.023

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1		Inhalation - Long-term – local effects	0.01 mg/m ³	0.02
PROC2	with local exhaust ventilation	Inhalation - Long-term – local effects	0.2 mg/m ³	0.37
PROC3	with local exhaust ventilation	Inhalation - Long-term – local effects	0.058 mg/m ³	0.11
PROC4	with local exhaust ventilation	Inhalation - Long-term – local effects	0.36 mg/m ³	0.67
PROC8a	Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC8b	Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
	Indoor, Outdoor	Inhalation - Long-term – local effects	0.049 mg/m ³	0.09
PROC15	with local exhaust ventilation	Inhalation - Long-term – local effects	0.093 mg/m ³	0.17

RCR = Risk characterisation ratio

ERC6a	Exposure Assessment Method : ECETOC TRA
PROC1	Exposure Assessment Method : ECETOC TRA
PROC2	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC3	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC4	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC15	Exposure Assessment Method : ART (Advanced Reach Tool)

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

3.4.1 Environment

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

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by the ES through scaling in EUSES.

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

3.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

4. ES4 : Industrial use as an intermediate (other)

4.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
		SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
		SU9	Manufacture of fine chemicals
Environmental release category	:	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Process category	:	PROC1	Use in closed process, no likelihood of exposure
		PROC2	Use in closed, continuous process with occasional controlled exposure
		PROC3	Use in closed batch process (synthesis or formulation)
		PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
		PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
		PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
		PROC15	Use as laboratory reagent
Product category	:	PC19	Intermediate

4.2. Conditions of use affecting exposure

4.2.1 Contributing scenario controlling environmental exposure for: ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

Amount

Annual site tonnage (tonnes/year):	:	3000
Maximum daily site tonnage (kg/day):	:	10000
Emission Days (days/year):	:	300

Environmental factors

Flow rate	:	390,000 m ³ /d
Dilution Factor (River)	:	40
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Continuous release.	
Emission or Release Factor: Air	: 0.1 %
Emission or Release Factor: Water	: 2 %
Emission or Release Factor: Soil	: 0.1 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Flow rate of sewage treatment plant effluent	:	10,000 m ³ /d
Effectiveness (of a measure)	:	87.85 %
Sludge Treatment	:	Do not apply industrial sludge to natural soils.
Remarks	:	European standard sewage treatment is assumed

4.2.2 Contributing scenario controlling worker exposure for: PROC1 Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in	Covers the percentage of the substance in the product up to 100 %
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Mixture/Article (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle substance within a closed system.

4.2.3 Contributing scenario controlling worker exposure for: PROC2 Use in closed, continuous process with occasional controlled exposure, PROC3 Use in closed batch process (synthesis or formulation), PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics

Concentration of the Substance in Mixture/Article Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 - 4.8 kPa
 Process Temperature : 80 - 110 °C

Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

4.2.4 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance

Product characteristics

Concentration of the Substance in Mixture/Article Covers the percentage of the substance in the product less than 1%.
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.12 kPa
 Process Temperature : 40 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

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Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

4.2.5 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 kPa
Process Temperature	: 80 °C

Frequency and duration of use

Exposure duration	: 30 min
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation., Sample via a closed loop or other system to avoid exposure.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed., Avoid splashing.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	: If above technical/organisational control measures are not feasible, then adopt following PPE:, Respirator with a vapour filter (EN 141)
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4.2.6 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, AP0305 Loading of application equipment - transfer of material from one container to another - indoor, AP0401 Loading of application equipment - transfer of material from one container to another - outdoor**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
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Physical Form (at time of use) : Liquid substance
Vapour pressure : 1.2 kPa
Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 4 h
Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

4.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Liquid substance
Vapour pressure : 0.23 kPa
Process Temperature : 50 °C

Frequency and duration of use

Exposure duration : 1 h
Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

4.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6a	Local PEC	Surface water	0.0639 mg/L	0.152
		Fresh water sediment	9.95 mg/kg dry weight (d.w.)	0.152
		Marine water	0.0246 mg/L	0.614
		Marine sediment	3.82 mg/kg dry weight (d.w.)	0.585
		STP	2.43 mg/l	0.0835
		Agricultural soil	0.173 mg/kg dry weight (d.w.)	0.0457
	Regional PEC	Surface water	0.00336 mg/L	0.0080
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine water	0.000336 mg/L	0.0084
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Air	0.0000141 mg/m ³	
		Agricultural soil	0.08 mg/kg (dw)	0.023

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1		Inhalation - Long-term – local effects	0.01 mg/m ³	0.02
PROC2	with local exhaust ventilation	Inhalation - Long-term – local effects	0.2 mg/m ³	0.37
PROC3	with local exhaust ventilation	Inhalation - Long-term – local effects	0.058 mg/m ³	0.11
PROC4	with local exhaust ventilation	Inhalation - Long-term – local effects	0.36 mg/m ³	0.67
PROC8a	Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC8b	Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
	Indoor, Outdoor	Inhalation - Long-term – local effects	0.049 mg/m ³	0.09
PROC15	with local exhaust ventilation	Inhalation - Long-term – local effects	0.093 mg/m ³	0.17

RCR = Risk characterisation ratio

ERC6a	Exposure Assessment Method : ECETOC TRA
PROC1	Exposure Assessment Method : ECETOC TRA
PROC2	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC3	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC4	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC15	Exposure Assessment Method : ART (Advanced Reach Tool)

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

4.4.1 Environment

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

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by the ES through scaling in EUSES.

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

4.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

5. ES5 : Formulation of solid preparations

5.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category	:	SU 10 ERC3	Formulation Formulation in materials
Process category	:	PROC5 PROC8a PROC8b PROC9	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities 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)
Product category	:	PROC15 PC32	Use as laboratory reagent Polymer preparations and compounds

5.2. Conditions of use affecting exposure

5.2.1 Contributing scenario controlling environmental exposure for: ERC3 Formulation in materials

Amount

Annual site tonnage (tonnes/year):	:	500
Maximum daily site tonnage (kg/day):	:	5000
Emission Days (days/year):	:	100

Environmental factors

Flow rate	:	18,000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Intermittent release.	
Emission or Release Factor: Air	: 30 %
Emission or Release Factor: Water	: 0.2 %
Emission or Release Factor: Soil	: 0.1 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal STP
Flow rate of sewage treatment plant effluent	:	2,000 m3/d
Effectiveness (of a measure)	:	87.85 %
Remarks	:	European standard sewage treatment is assumed

5.2.2 Contributing scenario controlling worker exposure for: PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance
Vapour pressure	:	0.1 - 4.8 kPa
Process Temperature	:	40 - 110 °C

Frequency and duration of use

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Revision Date 25.07.2017

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

5.2.3 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 - 40 °C

Frequency and duration of use

Exposure duration : 15 min - 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

5.2.4 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, AP0303 Loading of application equipment - batch, indoor, AP0304 Loading of application equipment - batch, outdoor**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

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Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

5.2.5 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 °C

Frequency and duration of use

Exposure duration : 1 - 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

5.2.6 Contributing scenario controlling worker exposure for: PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 °C

Frequency and duration of use

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Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Respirator with a dust filter
 Wear suitable gloves (tested to EN374) and eye protection.

5.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 - 40 °C

Frequency and duration of use

Exposure duration : 15 min - 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

5.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC3	Local PEC	Surface water	0.0639 mg/L	0.152
		Fresh water sediment	9.95 mg/kg dry weight (d.w.)	0.152
		Marine water	0.00639 mg/L	0.160
		Marine sediment	0.995 mg/kg dry weight (d.w.)	0.152
		STP	0.607 mg/L	0.0209
	Regional PEC	Agricultural soil	2.04 mg/kg dry weight (d.w.)	0.539
		Surface water	0.00336 mg/L	0.008
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine water	0.000336 mg/L	0.0084
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Air	0.0000141 mg/m ³	
		Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC5	Liquid substance, with local exhaust ventilation	Inhalation - Long-term – local effects	0.38 mg/m ³	0.7
PROC8b	Solid mixture, Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.05 mg/m ³	0.09
PROC8b	Liquid substance, Indoor, Outdoor	Inhalation - Long-term – local effects	0.11 mg/m ³	0.2
PROC8a	Solid mixture, 5%, Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.43 mg/m ³	0.8
PROC9	Solid mixture, with local exhaust ventilation, respiratory protection equipment	Inhalation - Long-term – local effects	0.05 mg/m ³	0.09
PROC15	Solid mixture, with local exhaust ventilation	Inhalation - Long-term – local effects	0.01 mg/m ³	0.02

RCR = Risk characterisation ratio

ERC3	Exposure Assessment Method : ECETOC TRA
PROC5	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ECETOC TRA
Process sampling	
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
Loading of application equipment - batch, indoor, Loading of application equipment - batch, outdoor	
PROC8a	Exposure Assessment Method : ECETOC TRA
PROC9	Exposure Assessment Method : ECETOC TRA
PROC15	Exposure Assessment Method : ECETOC TRA

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

5.4.1 Environment

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

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

5.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

6. ES6 : Industrial use of solid preparations

6.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category	:	SU11 ERC6d	Manufacture of rubber products Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Process category	:	PROC5 PROC6 PROC8a PROC8b PROC14	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) Calendering operations Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities Production of preparations or articles by tableting, compression, extrusion, pelletisation
Product category	:	PC32	Polymer preparations and compounds

6.2. Conditions of use affecting exposure

6.2.1 Contributing scenario controlling environmental exposure for: ERC6d Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Amount

Annual site tonnage (tonnes/year):	:	500
Maximum daily site tonnage (kg/day):	:	25000
Emission Days (days/year):	:	20

Environmental factors

Flow rate	:	18,000 m ³ /d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Intermittent release.		
Emission or Release Factor: Air	:	35 %
Emission or Release Factor: Water	:	0.005 %
Emission or Release Factor: Soil	:	0.025 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal STP
Flow rate of sewage treatment plant effluent	:	2,000 m ³ /d
Effectiveness (of a measure)	:	87.85 %
Remarks	:	European standard sewage treatment is assumed

6.2.2 Contributing scenario controlling worker exposure for: PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance
Vapour pressure	:	0.1 - 4.8 kPa
Process Temperature	:	40 - 110 °C

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Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

6.2.3 Contributing scenario controlling worker exposure for: PROC6 Calendering operations**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 3 kPa
 Process Temperature : 100 °C

Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

6.2.4 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 - 40 °C

Frequency and duration of use

Exposure duration : 15 min - 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

6.2.5 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 °C

Frequency and duration of use

Exposure duration : 1 - 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

6.2.6 Contributing scenario controlling worker exposure for: PROC14 Production of preparations or articles by tableting, compression, extrusion, pelletisation**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.
 Physical Form (at time of use) : Solid mixture, Dustiness: Medium
 Process Temperature : 20 - 40 °C

Frequency and duration of use

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Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

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

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6d	Local PEC	Surface water	0.0109 mg/L	0.026
		Fresh water sediment	1.7 mg/kg dry weight (d.w.)	0.026
		Marine water	0.00109 mg/L	0.0273
		Marine sediment	0.17 mg/kg dry weight (d.w.)	0.0260
		STP	0.0759 mg/L	0.00261
		Agricultural soil	0.916 mg/kg dry weight (d.w.)	0.255
	Regional PEC	Surface water	0.00336 mg/L	0.008
		Marine water	0.000336 mg/L	0.0084
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023
		Air	0.0000141 mg/m ³	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC5	Liquid substance, with local exhaust ventilation	Inhalation - Long-term – local effects	0.38 mg/m ³	0.7
PROC6	Liquid substance, with local exhaust ventilation	Inhalation - Long-term – local effects	0.22 mg/m ³	0.41
PROC8b	Solid substance, with local exhaust ventilation	Inhalation - Long-term – local effects	0.05 mg/m ³	0.09
PROC8a	Solid mixture, 5%, Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.43 mg/m ³	0.8
PROC14	Solid mixture, 5%	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28

RCR = Risk characterisation ratio

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ERC6d	Exposure Assessment Method : ECETOC TRA
PROC5	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC6	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ECETOC TRA
PROC8a	Exposure Assessment Method : ECETOC TRA
PROC14	Exposure Assessment Method : ECETOC TRA

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

6.4.1 Environment

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

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

6.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

7. ES7 : Formulation of liquid preparations for the textile industry

7.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category	:	SU 10	Formulation
Process category	:	ERC2	Formulation of preparations
	:	PROC3	Use in closed batch process (synthesis or formulation)
	:	PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
	:	PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
	:	PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
	:	PROC15	Use as laboratory reagent
Product category	:	PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids

7.2. Conditions of use affecting exposure

7.2.1 Contributing scenario controlling environmental exposure for: ERC2 Formulation of preparations

Amount

Annual site tonnage (tonnes/year):	:	11.5
Maximum daily site tonnage (kg/day):	:	1150
Emission Days (days/year):	:	10

Environmental factors

Flow rate	:	18,000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Intermittent release.	
Emission or Release Factor: Air	: 0.5 %
Emission or Release Factor: Water	: 2 %
Emission or Release Factor: Soil	: 0.01 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal STP
Flow rate of sewage treatment plant effluent	:	2,000 m3/d
Effectiveness (of a measure)	:	92.3 %
Remarks	:	European standard sewage treatment is assumed

7.2.2 Contributing scenario controlling worker exposure for: PROC3 Use in closed batch process (synthesis or formulation)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance
Vapour pressure	:	1.2 - 4.8 kPa
Process Temperature	:	80 - 110 °C

Frequency and duration of use

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Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

7.2.3 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product less than 1%.
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.12 kPa
 Process Temperature : 40 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

7.2.4 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.1 - 1.2 kPa
 Process Temperature : 20 - 80 °C

Frequency and duration of use

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Exposure duration : 15 min - 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Ensure dedicated sample points are provided.
 Industrial use Ensure samples are obtained under containment or extract ventilation., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

If above technical/organisational control measures are not feasible, then adopt following PPE:, Wear a respirator conforming to EN141 with Type A filter or better.
 Wear suitable gloves (tested to EN374) and eye protection.

7.2.5 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, AP0303 Loading of application equipment - batch, indoor, AP0304 Loading of application equipment - batch, outdoor

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

7.2.6 Contributing scenario controlling worker exposure for: PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product up to 100 %

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Mixture/Article (unless stated differently).
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 1.2 kPa
 Process Temperature : 80 °C

Frequency and duration of use

Exposure duration : > 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Provide the operation with a properly sited receiving hood., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

7.2.7 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent**Product characteristics**

Concentration of the Substance in Mixture/Article Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid substance
 Vapour pressure : 0.23 kPa
 Process Temperature : 50 °C

Frequency and duration of use

Exposure duration : 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

7.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR	
ERC2	Local PEC	Surface water	0.0908 mg/L	0.216	
		Fresh water sediment	14.1 mg/kg dry weight (d.w.)	0.216	
		Marine water	0.00908 mg/L	0.227	
		Marine sediment	1.41 mg/kg (dw)	0.216	
		STP	0.88 mg/L	0.030	
		Agricultural soil	3.49 mg/kg dry weight (d.w.)	0.992	
		Regional PEC	Surface water	0.00336 mg/L	0.008
			Marine water	0.000336 mg/L	0.0084
			Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
			Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
	Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023		
		Air	0.0000141 mg/m ³		

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC3	with local exhaust ventilation	Inhalation - Long-term – local effects	0.058 mg/m ³	0.11
PROC8a	Liquid mixture, Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC8b	Process sampling	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
PROC8b	Liquid substance, Indoor, Outdoor	Inhalation - Long-term – local effects	0.11 mg/m ³	0.2
PROC9		Inhalation - Long-term – local effects	0.05 mg/m ³	0.09
PROC15	with local exhaust ventilation	Inhalation - Long-term – local effects	0.093 mg/m ³	0.17

RCR = Risk characterisation ratio

ERC2	Exposure Assessment Method : ECETOC TRA
PROC3	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ECETOC TRA
Process sampling	
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool)
Loading of application equipment - batch, indoor, Loading of application equipment - batch, outdoor	
PROC9	Exposure Assessment Method : ECETOC TRA
PROC15	Exposure Assessment Method : ART (Advanced Reach Tool)

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

7.4.1 Environment

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

The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

7.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

8. ES8 : Industrial use of liquid preparations in the textile industry

8.1. Scenario description

Main User Groups	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category	:	SU5	Manufacture of textiles, leather, fur
Process category	:	ERC5	Industrial use resulting in inclusion into or onto a matrix
	:	PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
	:	PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
	:	PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
	:	PROC13	Treatment of articles by dipping and pouring
	:	PROC15	Use as laboratory reagent
Product category	:	PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids

8.2. Conditions of use affecting exposure

8.2.1 Contributing scenario controlling environmental exposure for: ERC5 Industrial use resulting in inclusion into or onto a matrix

Amount

Annual site tonnage (tonnes/year):	:	0.91
Maximum daily site tonnage (kg/day):	:	45.5
Emission Days (days/year):	:	20

Environmental factors

Flow rate	:	18,000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Intermittent release.		
Emission or Release Factor: Air	:	0.5 %
Emission or Release Factor: Water	:	50 %
Emission or Release Factor: Soil	:	1 %

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal STP
Flow rate of sewage treatment plant effluent	:	2,000 m3/d
Effectiveness (of a measure)	:	92.3 %
Remarks	:	European standard sewage treatment is assumed

8.2.2 Contributing scenario controlling worker exposure for: PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance
Vapour pressure	:	0.1 - 4.8 kPa
Process Temperature	:	40 - 110 °C

Frequency and duration of use

Exposure duration : 8 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

8.2.4 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, AP0303 Loading of application equipment - batch, indoor, AP0304 Loading of application equipment - batch, outdoor

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.1 - 1.2 kPa
 Process Temperature : 20 - 80 °C

Frequency and duration of use

Exposure duration : 15 min - 1 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Transfer via enclosed lines.
 Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid splashing.
 Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable respiratory protection (conforming to EN141 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.

Wear suitable gloves (tested to EN374) and eye protection.

8.2.6 Contributing scenario controlling worker exposure for: PROC8b Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, CS2 Process sampling

Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product less than 1%.

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Mixture/Article
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.1 - 1.2 kPa
 Process Temperature : 20 - 80 °C

Frequency and duration of use

Exposure duration : 15 - 60 min
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use Ensure dedicated sample points are provided., Ensure samples are obtained under containment or extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance, Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : If above technical/organisational control measures are not feasible, then adopt following PPE:, Respirator with a vapour filter (EN 141)

8.2.7 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at non-dedicated facilities, CS39 Equipment cleaning and maintenance**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 0,1%
 Physical Form (at time of use) : Liquid mixture
 Vapour pressure : 0.12 kPa
 Process Temperature : 40 °C

Frequency and duration of use

Exposure duration : 4 h
 Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor, Outdoor

Technical conditions and measures

Industrial use

Organisational measures to prevent /limit releases, dispersion and exposure

Dispose of empty containers and wastes safely., Avoid frequent and direct contact with substance
 Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

8.2.8 Contributing scenario controlling worker exposure for: PROC13 Treatment of articles by dipping and pouring**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 1 %
Physical Form (at time of use)	: Liquid substance
Vapour pressure	: 1.2 kPa
Process Temperature	: 80 °C

Frequency and duration of use

Exposure duration	: 1 h
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
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Technical conditions and measures

Industrial use Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

8.2.9 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent**Product characteristics**

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product less than 1%.
Physical Form (at time of use)	: Liquid mixture
Process Temperature	: 80 °C

Frequency and duration of use

Exposure duration	: 15 min - 1 h
Frequency of use	: <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor, Outdoor
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Technical conditions and measures

Industrial use Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid frequent and direct contact with substance
Minimization of manual phases, Clean equipment and the work area every day., Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374) and eye protection.

8.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC5	Local PEC	Surface water	0.0898 mg/L	0.214
		Fresh water sediment	14.0 mg/kg dry weight (d.w.)	0.214
		Marine water	0.00898 mg/L	0.225
		Marine sediment	1.40 mg/kg dry weight (d.w.)	0.214
		STP	0.871 mg/L	0.030
	Regional PEC	Agricultural soil	3.46 mg/kg dry weight (d.w.)	0.982
		Surface water	0.00336 mg/L	0.008
		Marine water	0.000336 mg/L	0.0084
		Fresh water sediment	0.958 mg/kg dry weight (d.w.)	0.0015
		Marine sediment	0.0912 mg/kg dry weight (d.w.)	0.014
		Agricultural soil	0.08 mg/kg dry weight (d.w.)	0.023
		Air	0.0000141 mg/m ³	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC5	Liquid substance, with local exhaust ventilation	Inhalation - Long-term – local effects	0.38 mg/m ³	0.7
PROC8b	Indoor, Outdoor	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
PROC8b	Process sampling, with local exhaust ventilation	Inhalation - Long-term – local effects	0.15 mg/m ³	0.28
PROC8a	Liquid mixture, Equipment cleaning and maintenance	Inhalation - Long-term – local effects	0.12 mg/m ³	0.22
PROC13		Inhalation - Long-term – local effects	0.36 mg/m ³	0.66
PROC15	Liquid mixture, with local exhaust ventilation	Inhalation - Long-term – local effects	0.1 mg/m ³	0.19

RCR = Risk characterisation ratio

ERC5	Exposure Assessment Method : ECETOC TRA
PROC5	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC8b	Exposure Assessment Method : ECETOC TRA
PROC8b	Loading of application equipment - batch, indoor, Loading of application equipment - batch, outdoor
PROC8b	Exposure Assessment Method : ART (Advanced Reach Tool), ECETOC TRA
PROC8a	Process sampling
PROC8a	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC13	Exposure Assessment Method : ART (Advanced Reach Tool)
PROC15	Exposure Assessment Method : ECETOC TRA

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

8.4.1 Environment

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

PRCO90054497

Version : 12.00 / GB (EN)

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The main driving parameters are :

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

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

8.4.2 Health

Guidance is based on assumed operating conditions which may not be applicable to all sites

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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