

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

- Trade name RHODIACID AA - ADIPIC ACID
- Index-No. 607-144-00-9
- REACH : Registration number 01-2119457561-38-0009
01-2119457561-38-0008 (OR)
01-2119457561-38-0010 (OR)

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 [mixing] of preparations and/ or re-packaging (excluding alloys)
- Manufacture of plastics products, including compounding and conversion
- Consumer uses: Private households (= general public = consumers)
- Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
- Electricity, steam, gas water supply and sewage treatment

- Use as intermediate or monomer
- Preparation and use of the formulations
- Use in the production of dish washing machine tablets
- Use in flue gas desulphurisation
- Laboratory activities

Uses advised against

- Food additive
- Animal feedstuff

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)**

Eye irritation, Category 2

H319: Causes serious eye irritation.

2.2 Label elements

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Regulation (EC) No 1272/2008

Hazardous products which must be listed on the label
Pictogram

**Signal word**

- Warning

Hazard statements

- H319 Causes serious eye irritation.

Precautionary statementsPrevention

- P264 Wash skin thoroughly after handling.
- P280 Wear eye protection/ face protection.

Response

- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337 + P313 If eye irritation persists: Get medical advice/ attention.

2.3 Other hazards which do not result in classification

- Slightly irritating to the skin.
- Harmful to aquatic organisms.
- Combustible solid.
- Divided solid.
- May form explosive dust-air mixture.

SECTION 3: Composition/information on ingredients**3.1 Substance****Information on Components and Impurities**

Chemical name	Identification number	Classification Regulation (EC) No 1272/2008	Concentration [%]
adipic acid	Index-No. : 607-144-00-9 CAS-No. : 124-04-9 Registration number: 01-2119457561-38-xxxx	Eye irritation, Category 2 ; H319	>= 99 - <= 100

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

3.2 Mixture

- Not applicable, this product is a substance.

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

- 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.

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In case of inhalation

- Move to fresh air.
- Consult a physician if necessary.

In case of skin contact

- Take off contaminated clothing and shoes immediately.
- Wash off with soap and water.
- Consult a physician if necessary.

In case of eye contact

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- If eye irritation persists, consult a physician

In case of ingestion

- Do NOT induce vomiting.
- Rinse mouth with water.
- Consult a physician if necessary.

4.2 Most important symptoms and effects, both acute and delayed

- no data available

4.3 Indication of any immediate medical attention and special treatment needed

- no data available

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

- Foam
- powder
- Water spray

Unsuitable extinguishing media

- None known.

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

- Combustible.
- Fine dust dispersed in air may ignite.

Hazardous combustion products:

- Carbon oxides

5.3 Advice for firefighters**Special protective equipment for firefighters**

- Boots
- Gloves
- Goggles

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

- Avoid contact with the skin and the eyes.

- Remove all sources of ignition.
- Personal protective equipment
- Wear suitable gloves.
- Safety glasses
- Boots

6.2 Environmental precautions

- Do not allow uncontrolled discharge of product into the environment.

6.3 Methods and materials for containment and cleaning up

Recovery

- Sweep up and shovel.
- Keep in properly labelled containers.
- Avoid dust formation.

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

- no data available

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Earth the equipment.
- Inert atmosphere for pneumatic apparatus.
- Use explosion-proof equipment.
- This powder should not be flowed through non-conductive ducts or pipes
- Use only appropriately classed electrical equipment.

- Avoid dust formation.
- Provide adequate ventilation.
- Ensure all equipment is electrically grounded before beginning transfer operations.
- Handle in accordance with good industrial hygiene and safety practice.

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.

7.2 Conditions for safe storage, including any incompatibilities

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Technical measures/Storage conditions

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

- Keep away from: Oxidizing materials.

Packaging material**Suitable material**

- Polyethylene
- Polypropylene
- Stainless steel

Unsuitable material

- Steel
- Aluminium and its alloys.

Remarks

- Intermediate Bulk Container (IBC)
- Paper bags
- Stainless steel road-tanker.
- Stainless steel rail-tankers.

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
adipic acid	TWA	5 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

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

Product name	Population	Route of exposure	Potential health effects	Exposure time	Value	Remarks
adipic acid	Workers	Dermal	Systemic effects	Acute	38 mg/kg bw/day	
	Workers	Inhalation	Systemic effects	Acute	264 mg/m3	
	Workers	Inhalation	Local effects	Acute	5 mg/m3	
	Workers	Dermal	Systemic effects	Long term	38 mg/kg bw/day	
	Workers	Inhalation	Systemic effects	Long term	264 mg/m3	
	Workers	Inhalation	Local effects	Long term	5 mg/m3	
	General population	Dermal	Systemic effects	Acute	19 mg/kg bw/day	
	General population	Inhalation	Systemic effects	Acute	65 mg/m3	
	General population	Oral	Systemic effects	Acute	19 mg/kg bw/day	
	General population	Dermal	Systemic effects	Long term	19 mg/kg bw/day	
	General population	Inhalation	Systemic effects	Long term	65 mg/m3	
	General population	Oral	Systemic effects	Long term	19 mg/kg bw/day	

Predicted No Effect Concentration (PNEC)

Product name	Compartment	Value	Remarks
adipic acid	Fresh water	0.126 mg/l	
	Intermittent use/release	0.46 mg/l	
	Marine water	0.0126 mg/l	
	Fresh water sediment	0.484 mg/kg (dw)	Derived with the Equilibrium Partitioning Method.
	Marine sediment	0.0484 mg/kg (dw)	Derived with the Equilibrium Partitioning Method.
	Soil	0.0228 mg/kg (dw)	Derived with the Equilibrium Partitioning Method.
	STP	59.1 mg/l	
	Oral (secondary poisoning)		No PNEC derivation as there is no potential for bioaccumulation.

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

- Dust must be extracted directly at the point of origin.

Individual protection measures

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Revision Date 26.09.2017

Respiratory protection

- Use a respirator with an approved filter if a risk assessment indicates this is necessary.

Hand protection

- Where there is a risk of contact with hands, use appropriate gloves

Eye protection

- Safety goggles

Skin and body protection

- Choose body protection according to the amount and concentration of the dangerous substance at the work place.

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.

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

- Do not allow uncontrolled discharge of product into the environment.

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

Form: Crystalline powder
Physical state: solid
Colour: white
Particle size: 298.6 - 331.6 µm (50 %)

Odour

very faint

Odour Threshold

no data available

Molecular weight

146.14 g/mol

pH

3.2 (1 % (m/v))
 Aqueous solution

Melting point/freezing point

Melting point/range: 150.85 °C
 Method: EU Test Guideline A1

Initial boiling point and boiling range

Boiling point/boiling range: 337.5 °C (1,013 hPa)
 Thermal decomposition: yes

Flash point

196 °C closed cup
 210 °C open cup

Evaporation rate (Butylacetate = 1)

no data available

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

<u>Flammability (solid, gas)</u>	The product is not flammable. Method: test Directive 92/69/EEC - Annex V Part A10
<u>Flammability/Explosive limit</u>	no data available
<u>Auto-ignition temperature</u>	> 400 °C Relative self-ignition temperature for solids Method: EU Test Guideline A16
<u>Vapour pressure</u>	0.097 hPa (18.5 °C) 2 hPa (165 °C)
<u>Vapour density</u>	no data available
<u>Density</u>	1.36 g/cm ³ (20 °C) <u>Bulk density:</u> 630 - 650 kg/m ³ (20 °C) loose
<u>Relative density</u>	no data available
<u>Solubility</u>	<u>Water solubility:</u> 15 g/l (20 °C) 23 g/l (25 °C) 52 g/l (40 °C) 1,600 g/l (100 °C) <u>Solubility in other solvents:</u> Methanol : 340 g/l (30 °C) soluble Benzene : insoluble
<u>Partition coefficient: n-octanol/water</u>	log Pow: 0.093
<u>Decomposition temperature</u>	337.5 °C
<u>Viscosity</u>	<u>Viscosity, dynamic :</u> Not applicable <u>Viscosity, kinematic :</u> Not applicable
<u>Explosive properties</u>	negative Method : EU Test Guideline A14 Mechanical sensitivity (friction) negative Method : EU Test Guideline A14 Mechanical sensitivity (shock) negative Method : EU Test Guideline A14 Thermal sensitivity
<u>Oxidizing properties</u>	Not considered as oxidizing, Structure-activity relationship (SAR)

9.2 Other information

<u>Dust explosion constant</u>	Maximum Pressure: 7.6 bar
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RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

<u>Minimum ignition concentration</u>	30 g/m ³
<u>Minimum ignition energy</u>	30 - 100 mJ Method: modified Hartmann tube - MIKE 3 Particle size < 63µm

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

- no data available

10.2 Chemical stability

- Stable at room temperature.

10.3 Possibility of hazardous reactions

- no data available

10.4 Conditions to avoid

- Dust
- Heat, flames and sparks.

10.5 Incompatible materials

- Strong oxidizing agents
- Strong acids
- Reacts with the following substances:
- Bases

10.6 Hazardous decomposition products

- no data available

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

adipic acid

LD50 : 5,560 mg/kg - Rat , male and female
Method: OECD Test Guideline 401
Unpublished reports

Acute inhalation toxicity

adipic acid

No mortality observed at this dose.

LC50 - 4 h (Dust) : > 7.7 mg/l - Rat

Method: OECD Test Guideline 403

Not classified as hazardous for acute inhalation toxicity according to GHS.
Unpublished reports

Acute dermal toxicity

adipic acid

No mortality observed at this dose.

LD50 : > 7,940 mg/kg - Rat

Unpublished reports

Acute toxicity (other routes of administration)

no data available

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Skin corrosion/irritation

adipic acid

Rabbit
Mild skin irritation
Method: OECD Test Guideline 404
Unpublished reports

Serious eye damage/eye irritation

adipic acid

Rabbit
Risk of serious damage to eyes.
Method: OECD Test Guideline 405
Unpublished reports

"[WARNING] Inconsistency between available data and entry in Annex VI of CLP regulation"

Respiratory or skin sensitisation

adipic acid

Maximisation Test - Guinea pig
Responding animals in GPMT < 30%
Unpublished reports

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Mutagenicity**Genotoxicity in vitro**

adipic acid

Ames test
with and without metabolic activationnegative
Method: OECD Test Guideline 471
Unpublished reportsChromosome aberration test in vitro
Strain: human diploid fibroblasts
with and without metabolic activationnegative
Unpublished reportsGene mutation assays in mammalian cells.
Strain: Chinese hamster lung cells
with and without metabolic activationnegative
Method: OECD Test Guideline 476
Unpublished reportsGene mutation assays in mammalian cells.
Strain: Chinese hamster fibroblasts
with and without metabolic activationnegative
Method: OECD Test Guideline 476
Unpublished reports**Genotoxicity in vivo**

adipic acid

Chromosome aberration test in vivo - Rat
male
Oralnegative
Gavage
Unpublished reports**Carcinogenicity**

adipic acid

Rat
Oral studies did not reveal any carcinogenic potential
Published data**Toxicity for reproduction and development****Toxicity to reproduction/Fertility**

adipic acid

No toxicity to reproduction, Published data, internal evaluation

Developmental Toxicity/Teratogenicity

adipic acid

Oral
General Toxicity Maternal NOAEL: ≥ 288 mg/kg
Teratogenicity NOAEL: ≥ 288 mg/kg
Gavage, Did not show teratogenic effects in animal experiments., Published dataOral
General Toxicity Maternal NOAEL: ≥ 250 mg/kg

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Teratogenicity NOAEL: >= 250mg/kg
Gavage, Did not show teratogenic effects in animal experiments., Published data

STOT**STOT - single exposure**

adipic acid

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

STOT - repeated exposure

adipic acid

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

adipic acid

Oral 28-day - Rat , male and female
NOAEL: 750 mg/kg bw/day
in food
Unpublished reports

Experience with human exposure

no data available

Aspiration toxicity

no data available

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

adipic acid

LC50 - 96 h : > 1,000 mg/l - Danio rerio (zebra fish)
static test
Analytical monitoring: yes

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

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Acute toxicity to daphnia and other aquatic invertebrates.

adipic acid EC50 - 48 h : 46 mg/l - Daphnia magna (Water flea)
 Method: OECD Test Guideline 202
 Harmful to aquatic invertebrates.
 Unpublished reports

Toxicity to aquatic plants

adipic acid ErC50 - 72 h : 59 mg/l - Pseudokirchneriella subcapitata (microalgae)
 static test
 End point: Growth rate
 Method: OECD Test Guideline 201
 Published data
 Harmful to algae.

NOErC - 72 h : 41 mg/l - Pseudokirchneriella subcapitata (microalgae)
 static test
 End point: Growth rate
 Method: OECD Test Guideline 201
 Published data
 No adverse chronic effect observed up to and including the threshold of 1 mg/L.

Toxicity to microorganisms

adipic acid EC50 - 3 h : 4,747 mg/l - activated sludge
 static test
 Analytical monitoring: no
 End point: Respiration inhibition
 Method: OECD Test Guideline 209
 Published data

IC50 - 40 h : 591.02 mg/l - Tetrahymena pyriformis
 static test
 Analytical monitoring: no
 End point: Growth inhibition
 Method: according to a standardised method
 Published data

Chronic toxicity to fish no data available

Chronic toxicity to daphnia and other aquatic invertebrates.

adipic acid NOEC: 6.3 mg/l - 21 Days - Daphnia magna (Water flea)
 Reproduction Test
 Method: OECD Test Guideline 211
 Published data
 No adverse chronic effect observed up to and including the threshold of 1 mg/L.

Chronic Toxicity to aquatic plants no data available

12.2 Persistence and degradability**Abiotic degradation**

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Stability in water

adipic acid

Not applicable,

Photodegradation

adipic acid

Sensitizer: OH

Concentration sensitizer in molecule/cm³: 500,000 1/cm³Rate constant in cm³/molecule*s: 5.5893E-12 cm³/s

Half-life indirect photolysis: 2.9 Days

Method: Structure-activity relationship (SAR)

Physical- and photo-chemical elimination

no data available

Biodegradation**Biodegradability**

adipic acid

Ready biodegradability study:

Method: OECD Test Guideline 301 D

83 % - 30 Days

The substance fulfills the criteria for ultimate aerobic biodegradability and ready biodegradability

O₂ consumption

Inoculum: Sewage effluent

Published data

Inherent biodegradability study

Method: Zahn-Wellens Test

> 90 % - 5 Days

The substance fulfills the criteria for inherent ultimate biodegradability

Dissolved organic carbon (DOC)

Inoculum: Sewage effluent

Published data

Simulation study

Method: OECD Test Guideline 303

99 % - 1 Days

Dissolved organic carbon (DOC)

Inoculum: activated sludge

Published data

Soil

Method: according to a standardised method

84 % - 30 Days

CO₂ evolution test

Published data

Degradability assessment

adipic acid

The product is considered to be rapidly degradable in the environment

12.3 Bioaccumulative potential**Partition coefficient: n-octanol/water**

adipic acid

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

Bioconcentration factor (BCF)

no data available

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

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

adipic acid

Koc: 2.4

Structure-activity relationship (SAR)

Koc: 5.3

Structure-activity relationship (SAR)

Koc: 21.5

Structure-activity relationship (SAR)

Mobile in soils

Known distribution to environmental compartments

adipic acid

Ultimate destination of the product : Water

12.5 Results of PBT and vPvB assessment

adipic acid

Not classified as PBT substance.

Not classified as vPvB.

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

adipic acid

Harmful to aquatic organisms.

Chronic aquatic toxicity

adipic acid

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

- Wash out general purpose tankers (rail-road) with water.
- Incinerate bags and flexible containers.
- 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**

not regulated

RID

not regulated

IMDG

not regulated

IATA

not regulated

ADN/ADNR

not regulated

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

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

Inventory Information	Status
United States TSCA Inventory	- Listed on Inventory
Canadian Domestic Substances List (DSL)	- Listed on Inventory
Australia Inventory of Chemical Substances (AICS)	- Listed on Inventory
Japan. CSCL - Inventory of Existing and New Chemical Substances	- Listed on Inventory
Korea. Korean Existing Chemicals Inventory (KECI)	- Listed on Inventory
China. Inventory of Existing Chemical Substances in China (IECSC)	- Listed on Inventory
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	- Listed on Inventory

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.**

- H319 Causes serious eye 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

PRCO90031486

Version : 15.01 / GB (EN)

www.solvay.com



RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

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.

RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Annex

Scenario List

1. ES1 : Use as intermediate or monomer	18
2. ES2 : Preparation and use of the formulations	24
3. ES3 : Use in the production of dish washing machine tablets	29
4. ES4 : Use of dish washing machine tablets by consumers.....	33
5. ES5 : Use in flue gas desulphurisation	35
6. ES6 : Laboratory activities	37

1. ES1 : Use as intermediate or monomer

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 SU8 SU9 SU12	Industrial uses: Uses of substances as such or in preparations at industrial sites Manufacture of bulk, large scale chemicals (including petroleum products) Manufacture of fine chemicals Manufacture of plastics products, including compounding and conversion
Environmental release category	:	ERC6a ERC6c ERC6d	Industrial use resulting in manufacture of another substance (use of intermediates) Industrial use of monomers for manufacture of thermoplastics Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Process category	:	PROC1 PROC2 PROC3 PROC4 PROC8a PROC8b PROC9	Use in closed process, no likelihood of exposure Use in closed, continuous process with occasional controlled exposure Use in closed batch process (synthesis or formulation) Use in batch and other process (synthesis) where opportunity for exposure arises 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	:	PC19 PC32	Intermediate 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), ERC6c Industrial use of monomers for manufacture of thermoplastics, ERC6d Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Amount

Local tonnage (T/year)	:	
Remarks	:	Confidential business information

PRCO90031486
Version : 15.01 / GB (EN)

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RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

EU tonnage (T/year) :
 Remarks : Confidential business information
 Local daily emission to waste water : 50.1 kg
 Maximum daily local emission to air : 5 kg

Environmental factors

Flow rate : 18,000 m3/d

Other given operational conditions affecting environmental exposure

Continuous release.
 Number of emission days per year : 300

Technical conditions and measures / Organizational measures

Air : Treat air emission to provide a typical removal efficiency of
 (%):(Effectiveness (of a measure): > 98 %)

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant : Onsite sewage treatment plant
 Percentage removed from waste water : 96 %

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

Physical Form (at time of use) : Liquid mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

1.2.3 Contributing scenario controlling worker exposure for: 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 mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

PRCO90031486

Version : 15.01 / GB (EN)

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RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Use suitable 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 Solid substance

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 substance

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

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

Use suitable eye protection and gloves.

1.2.5 Contributing scenario controlling worker exposure for: PROC8a Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities Liquid mixture

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
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 15 minutes/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)
 Use suitable eye protection.

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, PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) Solid substance

Product characteristics

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

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Version : 15.01 / GB (EN)

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Revision Date 26.09.2017

Mixture/Article (unless stated differently).
Physical Form (at time of use) : Solid substance

Frequency and duration of use

Frequency of use : 240 days/year
Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

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

Use suitable eye protection and gloves.

1.2.7 Contributing scenario controlling worker exposure for: 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) Liquid mixture

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

Frequency and duration of use

Frequency of use : 240 days/year
Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)
Use suitable eye protection.

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Revision Date 26.09.2017

1.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC6a, ERC6c, ERC6d	PEC	Fresh water	0.053 mg/L	0.43
		Fresh water sediment	0.045 mg/kg (ww)	0.53
		STP	1 mg/L	0.017
	Regional PEC	Fresh water	0.003 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1	Liquid mixture	Inhalation - Long-term – local effects	0.04 mg/m ³	0.01
		Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.01
PROC4	Liquid mixture, <1 hr:	Inhalation - Long-term – local effects	4.26 mg/m ³	0.85
		Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.04
PROC8a	Solid substance	Inhalation - Long-term – local effects	0.35 mg/m ³	0.07
		Dermal - Long-term - systemic effects	13.71 mg/kg bw/day	0.36
	Liquid mixture, <15 min	Inhalation - Long-term – local effects	4.26 mg/m ³	0.85
		Dermal - Long-term - systemic effects	2.74 mg/kg bw/day	0.07
PROC8b, PROC9	Solid substance	Inhalation - Long-term – local effects	0.07 mg/m ³	0.01
		Dermal - Long-term - systemic effects	6.86 mg/kg bw/day	0.18
	Liquid mixture, <1 hr:	Inhalation - Long-term – local effects	4.26 mg/m ³	0.85
		Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.04

RCR = Risk characterisation ratio

ERC6a, ERC6c, ERC6d	Exposure Assessment Method : EUSES
PROC1	Exposure Assessment Method : ECETOC TRA
PROC4	Exposure Assessment Method : ECETOC TRA
PROC8a	Exposure Assessment Method : ECETOC TRA
PROC8b, PROC9	Exposure Assessment Method : ECETOC TRA

For acute inhalatory effects, the full shift estimations were multiplied by 2 to derive acute exposure estimates

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

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.

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Revision Date 26.09.2017

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

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Revision Date 26.09.2017

2. ES2 : Preparation and use of the formulations**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
		SU5	Manufacture of textiles, leather, fur
		SU 10	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Environmental release category	:	ERC2	Formulation of preparations
		ERC6b	Industrial use of reactive processing aids
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
		PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
		PROC7	Industrial spraying
		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)
		PROC10	Roller application or brushing
		PROC13	Treatment of articles by dipping and pouring

2.2. Conditions of use affecting exposure**2.2.1 Contributing scenario controlling environmental exposure for: ERC2 Formulation of preparations, ERC6b Industrial use of reactive processing aids****Amount**

Local tonnage (T/year)	:	
Remarks	:	Confidential business information
EU tonnage (T/year)	:	
Remarks	:	Confidential business information
Local daily emission to waste water	:	40.5 kg
Maximum daily local emission to air	:	20.3 kg

Environmental factors

Flow rate	:	18,000 m3/d
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Other given operational conditions affecting environmental exposure

Continuous release.	
Number of emission days per year	: 300

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%) : (Effectiveness (of a measure): > 98 %)
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Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Percentage removed from waste water	:	96 %

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Revision Date 26.09.2017

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 5%.
 Physical Form (at time of use) : Liquid mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

2.2.3 Contributing scenario controlling worker exposure for: PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises, 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, PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing), PROC10 Roller application or brushing, 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 5%.
 Physical Form (at time of use) : Liquid mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)
 Use suitable eye protection.

2.2.5 Contributing scenario controlling worker exposure for: PROC7 Industrial spraying**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
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

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Revision Date 26.09.2017

(Effectiveness (of a measure): 95 %)

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

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Revision Date 26.09.2017

2.3. Exposure estimation and reference to its source

Environment

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC2, ERC6b	PEC	Fresh water	0.11 mg/L	0.87
		Fresh water sediment	0.091 mg/kg (ww)	0.87
		STP	0.81 mg/L	0.014
	Regional PEC	Fresh water	0.003 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC1	Liquid mixture, 5%	Inhalation - Long-term – local effects	0.01 mg/m ³	0
		Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.01
PROC4	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.24
		Dermal - Long-term - systemic effects	0.27 mg/kg bw/day	0.01
PROC5	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.24
		Dermal - Long-term - systemic effects	0.55 mg/kg bw/day	0.01
PROC8a	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	2.43 mg/m ³	0.49
		Dermal - Long-term - systemic effects	0.55 mg/kg bw/day	0.01
PROC8b	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.2
		Dermal - Long-term - systemic effects	0.27 mg/kg bw/day	0.01
PROC9	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.2
		Dermal - Long-term - systemic effects	0.27 mg/kg bw/day	0.01
PROC10	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	2.43 mg/m ³	0.49
		Dermal - Long-term - systemic effects	1.1 mg/kg bw/day	0.03
PROC13	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	2.43 mg/m ³	0.49
		Dermal - Long-term - systemic effects	0.55 mg/kg bw/day	0.01
PROC7	Liquid mixture, 5%, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.24
		Dermal - Long-term - systemic effects	0.09 mg/kg bw/day	0

RCR = Risk characterisation ratio

ERC2, ERC6b

Exposure Assessment Method : EUSES

PROC1

Exposure Assessment Method : ECETOC TRA

PROC4

Exposure Assessment Method : ECETOC TRA

PRCO90031486

Version : 15.01 / GB (EN)

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RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

PROC5	Exposure Assessment Method : ECETOC TRA
PROC8a	Exposure Assessment Method : ECETOC TRA
PROC8b	Exposure Assessment Method : ECETOC TRA
PROC9	Exposure Assessment Method : ECETOC TRA
PROC10	Exposure Assessment Method : ECETOC TRA
PROC13	Exposure Assessment Method : ECETOC TRA
PROC7	Exposure Assessment Method : ECETOC TRA

For acute inhalatory effects, the full shift estimations were multiplied by 2 to derive acute exposure estimates

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

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.

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Revision Date 26.09.2017

3. ES3 : Use in the production of dish washing machine tablets**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
		SU 10	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Environmental release category	:	ERC2	Formulation of preparations
Process category	:	PROC2	Use in closed, continuous process with occasional controlled exposure
		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
		PROC13	Treatment of articles by dipping and pouring
		PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation

3.2. Conditions of use affecting exposure**3.2.1 Contributing scenario controlling environmental exposure for: ERC2 Formulation of preparations****Amount**

Local tonnage (T/year)	:	
Remarks	:	Confidential business information
EU tonnage (T/year)	:	
Remarks	:	Confidential business information
Local daily emission to waste water	:	8.1 kg
Maximum daily local emission to air	:	1.62 kg

Environmental factors

Flow rate	:	18,000 m3/d
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Other given operational conditions affecting environmental exposure

Continuous release.	
Number of emission days per year	: 300

Technical conditions and measures / Organizational measures

Air	:	Exhaust ventilation equipped with filters.(Effectiveness (of a measure): > 99 %)
Remarks	:	Collection of spills and handling by an external third party (typically incineration)

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Percentage removed from waste water	:	96 %
Sludge Treatment	:	Sludge should be incinerated, contained or reclaimed.

3.2.2 Contributing scenario controlling worker exposure for: PROC2 Use in closed, continuous process with occasional controlled exposure**Product characteristics**

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 25 %.
Physical Form (at time of use)	:	Liquid mixture
Remarks	:	Low vapour pressure

PRCO90031486

Version : 15.01 / GB (EN)

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RHODIACID AA - ADIPIC ACID

Revision Date 26.09.2017

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Use suitable eye protection and gloves.

3.2.3 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 25 %.
 Physical Form (at time of use) : Liquid mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

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, 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 25 %.
 Physical Form (at time of use) : Liquid mixture
 Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year
 Frequency of use : < 15 minutes/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)
 Use suitable eye protection.

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

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

PRCO90031486

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Revision Date 26.09.2017

Mixture/Article
Physical Form (at time of use) : Solid substance

Frequency and duration of use

Frequency of use : 240 days/year
Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Use suitable eye protection and gloves.

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

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC2	PEC	Fresh water	0.044 mg/L	0.36
		Fresh water sediment	0.037 mg/kg (ww)	0.36
		STP	0.16 mg/L	0.0027
	Regional PEC	Fresh water	0.003 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC2	Liquid mixture, < 4h, 5-25 %	Inhalation - Long-term – local effects	2.19 mg/m ³	0.44
		Dermal - Long-term - systemic effects	0.82 mg/kg bw/day	0.02
PROC5	Liquid mixture, <1 hr., 5-25 %	Inhalation - Long-term – local effects	3.65 mg/m ³	0.73
		Dermal - Long-term - systemic effects	1.65 mg/kg bw/day	0.04
PROC8a, PROC13	Liquid mixture, <15 min, 5-25 %	Inhalation - Long-term – local effects	3.65 mg/m ³	0.73
		Dermal - Long-term - systemic effects	1.65 mg/kg bw/day	0.04
PROC14	Solid substance, > 4h, < 1%	Inhalation - Long-term – local effects	0.01 mg/m ³	0
		Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.01

RCR = Risk characterisation ratio

ERC2 Exposure Assessment Method : EUSES
 PROC2 Exposure Assessment Method : ECETOC TRA
 PROC5 Exposure Assessment Method : ECETOC TRA
 PROC8a, PROC13 Exposure Assessment Method : ECETOC TRA
 PROC14 Exposure Assessment Method : ECETOC TRA

For acute inhalatory effects, the full shift estimations were multiplied by 2 to derive acute exposure estimates

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Revision Date 26.09.2017

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

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.

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Revision Date 26.09.2017

4. ES4 : Use of dish washing machine tablets by consumers**4.1. Scenario description**

Main User Groups	:	SU 21	Consumer uses: Private households (= general public = consumers)
Environmental release category	:	ERC8a	Wide dispersive indoor use of processing aids in open systems
Product category	:	PC35	Washing and cleaning products (including solvent based products)

4.2. Conditions of use affecting exposure**4.2.1 Contributing scenario controlling environmental exposure for: ERC8a Wide dispersive indoor use of processing aids in open systems****Amount**

Local tonnage (T/year)	:	
Remarks	:	Confidential business information
EU tonnage (T/year)	:	
Remarks	:	Confidential business information
Local daily emission to waste water	:	1.23 kg
Maximum daily local emission to air	:	1.23 kg
Regional daily emission to waste water.	:	2470 kg

Environmental factors

Flow rate	:	18,000 m3/d
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Other given operational conditions affecting environmental exposure

Continuous release.		
Number of emission days per year	:	365
Remarks	:	Indoor use, down-the-drain

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Municipal sewage treatment plant
Percentage removed from waste water	:	67 %

4.2.2 Contributing scenario controlling consumer exposure for: PC35 Washing and cleaning products (including solvent based products) ,**Product characteristics**

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 15%
Physical Form (at time of use)	:	Solid substance

Amount

Amount per Application	:	0.02 kg
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Frequency and duration of use

Frequency of use	:	1 events/day
Duration of exposure by events	:	6 min

Human factors not influenced by risk management

Dermal exposure	:	Fingertips (35,7cm ²)
Adults	:	

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Revision Date 26.09.2017

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

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC8a	PEC	Fresh water	0.043 mg/L	0.25
		Fresh water sediment	0.026 mg/kg (ww)	0.25
		STP	0.025 mg/L	0.0004
	Regional PEC	Fresh water	0.02 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PC35	Solid substance	Inhalation - Acute - local effects	1.3 mg/m ³	0.26
		Dermal - Long-term - systemic effects	0.77 mg/kg bw/day	0.04

RCR = Risk characterisation ratio

ERC8a Exposure Assessment Method : EUSES
 PC35 Exposure Assessment Method : ECETOC TRA

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

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.

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Revision Date 26.09.2017

5. ES5 : Use in flue gas desulphurisation**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	:	SU23 ERC8e	Electricity, steam, gas water supply and sewage treatment Wide dispersive outdoor use of reactive substances in open systems
Process category	:	PROC16	Using material as fuel sources, limited exposure to unburned product to be expected

5.2. Conditions of use affecting exposure**5.2.1 Contributing scenario controlling environmental exposure for: ERC8e Wide dispersive outdoor use of reactive substances in open systems****Amount**

Local tonnage (T/year)	:	
Remarks	:	Confidential business information
Local daily emission to waste water	:	36 kg
Maximum daily local emission to air	:	45 kg

Environmental factors

Flow rate	:	1,800 m3/d
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Other given operational conditions affecting environmental exposure

Continuous release.	
Number of emission days per year	: 300

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide a typical removal efficiency of (%):(Effectiveness (of a measure): > 98 %)
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Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant	:	Onsite sewage treatment plant
Percentage removed from waste water	:	96 %

5.2.2 Contributing scenario controlling worker exposure for: PROC16 Using material as fuel sources, limited exposure to unburned product to be expected**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
Remarks	:	Low vapour pressure

Frequency and duration of use

Frequency of use	:	240 days/year
Frequency of use	:	< 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
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Conditions and measures related to personal protection, hygiene and health evaluation

Use suitable eye protection and gloves.

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

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC8e	PEC	Fresh water	0.096 mg/L	0.76
		Fresh water sediment	0.08 mg/kg (ww)	0.76
		STP	0.72 mg/L	0.20
	Regional PEC	Fresh water	0.003 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC16	Liquid mixture, 1-5 %, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.24
		Dermal - Long-term - systemic effects	0.07 mg/kg bw/day	0.002

RCR = Risk characterisation ratio

ERC8e Exposure Assessment Method : EUSES
 PROC16 Exposure Assessment Method : ECETOC TRA

For acute inhalatory effects, the full shift estimations were multiplied by 2 to derive acute exposure estimates

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

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 : Laboratory activities**6.1. Scenario description**

Main User Groups	:	SU 22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	:	SU22	Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category	:	ERC8a ERC8b	Wide dispersive indoor use of processing aids in open systems Wide dispersive indoor use of reactive substances in open systems
Process category	:	PROC15	Use as laboratory reagent
Product category	:	PC21	Laboratory chemicals

6.2. Conditions of use affecting exposure**6.2.1 Contributing scenario controlling environmental exposure for: ERC8a Wide dispersive indoor use of processing aids in open systems, ERC8b Wide dispersive indoor use of reactive substances in open systems****Amount**

Remarks : The amount used is smaller than 1 tonne/year

Environmental factors

Flow rate : 18,000 m3/d

Other given operational conditions affecting environmental exposure

Continuous release.

Number of emission days per year : 300

Technical conditions and measures / Organizational measures

Air : Exhaust ventilation equipped with filters. (Effectiveness (of a measure): > 99 %)

Remarks : Collection of spills and handling by an external third party (typically incineration)

Conditions and measures related to sewage treatment plant

Type of Sewage Treatment Plant : Onsite sewage treatment plant

Percentage removed from waste water : 96 %

6.2.2 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent Solid substance**Product characteristics**

Physical Form (at time of use) : Solid substance

Vapour pressure : 0.097 hPa

Process Temperature : 18.5 °C

Frequency and duration of use

Frequency of use : 240 days/year

Frequency of use : > 4 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Use suitable eye protection and gloves.

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Revision Date 26.09.2017

6.2.3 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent Liquid mixture, CS110 without local exhaust ventilation**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : Liquid mixture

Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year

Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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

Use suitable eye protection and gloves.

6.2.4 Contributing scenario controlling worker exposure for: PROC15 Use as laboratory reagent Liquid mixture, CS109 with local exhaust ventilation**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : Liquid mixture

Remarks : Low vapour pressure

Frequency and duration of use

Frequency of use : 240 days/year

Frequency of use : < 1 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
(Effectiveness (of a measure): 80 %)

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

Use suitable eye protection and gloves.

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

Release factor	Value type	Compartment	Environmental exposure	RCR
ERC8a, ERC8b		Fresh water		< 1
		Fresh water sediment		< 1
		STP		< 1
	Regional PEC	Fresh water	0.003 mg/L	
		Fresh water sediment	0.021 mg/kg (ww)	

Human Health

Contributing Scenario	Specific conditions	Value type	Level of Exposure	RCR
PROC15	Solid substance	Inhalation - Long-term – local effects	0.1 mg/m ³	0.02
		Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.01
	Liquid mixture, 5-25 %, without local exhaust ventilation, <1 hr:	Inhalation - Long-term – local effects	3.65 mg/m ³	0.73
		Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.01
	Liquid mixture, 5-25 %, with local exhaust ventilation, <1 hr:	Inhalation - Long-term – local effects	1.22 mg/m ³	0.24
		Dermal - Long-term - systemic effects	0.03 mg/kg bw/day	0

RCR = Risk characterisation ratio

ERC8a, ERC8b Exposure Assessment Method : Qualitative approach used to conclude safe use.
 PROC15 Exposure Assessment Method : ECETOC TRA

For acute inhalatory effects, the full shift estimations were multiplied by 2 to derive acute exposure estimates

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

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.