

## SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

**CITRIC ACID ANHYDROUS**

Version 6.1

Print Date 2020/09/04

Revision date / valid from 2020/09/04

MSDS code: MCIT100

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

Trade name : CITRIC ACID ANHYDROUS  
Substance name : Citric acid  
CAS-No. : 77-92-9  
EC-No. : 201-069-1  
EU REACH-Reg. No. : 01-2119457026-42-xxxx

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.  
Uses advised against : At this moment we have not identified any uses advised against  
Remarks : Before referring to any Exposure Scenario attached to this Safety Data Sheet please check the grade of the product: the Exposure Scenarios presented are not related to all product grade

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

Company : Brenntag UK Limited  
Alpha House, Lawnswood Business Park  
GB LS16 6QY Leeds  
Telephone : +44 (0) 113 3879 200  
Telefax : +44 (0) 113 3879 280  
E-mail address : msds@brenntag.co.uk

**1.4. Emergency telephone number**

Emergency telephone number : Emergency only telephone number (open 24 hours):  
+44 (0) 1865 407333 (N.C.E.C. Culham)

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008

**REGULATION (EC) No 1272/2008**

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Hazard class	Hazard category	Target Organs	Hazard statements
Eye irritation	Category 2	---	H319

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

**Most important adverse effects**

Human Health : See section 11 for toxicological information.

Physical and chemical hazards : See section 9/10 for physicochemical information.

Potential environmental effects : See section 12 for environmental information.

**2.2. Label elements****Labelling according to Regulation (EC) No 1272/2008**

Hazard symbols :



Signal word : Warning

Hazard statements : H319 Causes serious eye irritation.

Precautionary statements

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

Response : 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.

**Hazardous components which must be listed on the label:**

- Citric acid

**2.3. Other hazards**

For Results of PBT and vPvB assessment see section 12.5.

**CITRIC ACID ANHYDROUS****SECTION 3: Composition/information on ingredients****3.1. Substances**

		Classification (REGULATION (EC) No 1272/2008)	
Hazardous components	Amount [%]	Hazard class / Hazard category	Hazard statements
Citric acid			
CAS-No.	: 77-92-9	<= 100	Eye Irrit.2
EC-No.	: 201-069-1		H319
EU REACH-	: 01-2119457026-42-xxxx		
Reg. No.			

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

**SECTION 4: First aid measures****4.1. Description of first aid measures**

General advice	: Take off all contaminated clothing immediately. If symptoms call a physician.
If inhaled	: Remove to fresh air. If symptoms persist, call a physician.
In case of skin contact	: Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
In case of eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
If swallowed	: Rinse mouth with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If symptoms persist, call a physician.
Protection of First Aid Responders	: First Aid responders should pay attention to self-protection and use the recommended protective clothing.

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

Symptoms	: See Section 11 for more detailed information on health effects and symptoms.
Effects	: Dust in the eyes may cause mechanical irritation. See Section 11 for more detailed information on health effects and symptoms.

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

Treatment	: If in eyes or on skin, rinse well with water. Treat
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symptomatically.

**SECTION 5: Firefighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Water spray, foam, dry powder or CO<sub>2</sub>.  
Unsuitable extinguishing media : High volume water jet

**5.2. Special hazards arising from the substance or mixture**

- Specific hazards during firefighting : Combustible solids. In case of fire hazardous decomposition products may be produced such as:  
Hazardous combustion products : Carbon monoxide, Carbon dioxide (CO<sub>2</sub>)

**5.3. Advice for firefighters**

- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear personal protective equipment.  
Further advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Cool closed containers exposed to fire with water spray.

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

- Personal precautions : Use personal protective equipment. Keep away unprotected persons. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin and eyes.

**6.2. Environmental precautions**

- Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

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

- Methods and materials for containment and cleaning up : Use mechanical handling equipment. Keep in suitable, closed containers for disposal.  
Further information : Treat recovered material as described in the section "Disposal considerations".

**6.4. Reference to other sections**

See Section 1 for emergency contact information.

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See Section 8 for information on personal protective equipment.  
See Section 13 for waste treatment information.

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

- Advice on safe handling : Keep container tightly closed. Use personal protective equipment. Avoid dust formation. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
- Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

**7.2. Conditions for safe storage, including any incompatibilities**

- Requirements for storage areas and containers : Store in original container.
- Advice on protection against fire and explosion : Avoid dust formation. Normal measures for preventive fire protection.
- Further information on storage conditions : Keep tightly closed in a dry and cool place. Avoid moisture.
- Advice on common storage : Keep away from food, drink and animal feedingstuffs. Incompatible with oxidizing agents.
- Storage temperature : 10 - 30 °C

**7.3. Specific end use(s)**

- Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

**SECTION 8: Exposure controls/personal protection****8.1. Control parameters****Other Occupational Exposure Limit Values**

- (Additional) Information : Contains no substances with occupational exposure limit values.  
Contains no substances with occupational exposure limit values.

<b>Component:</b>	<b>Citric acid</b>	<b>CAS-No. 77-92-9</b>
<b>Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)</b>		

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No DNEL value was derived. :

Predicted No Effect Concentration (PNEC)	
Fresh water	: 0.44 mg/l
Marine water	: 0.044 mg/l
Sewage treatment plant (STP)	: 1000 mg/l
Fresh water sediment	: 34.6 mg/kg d.w.
Marine sediment	: 3.46 mg/kg d.w.
Soil	: 33.1 mg/kg d.w.

Fresh water	: 0.44 mg/l
Marine water	: 0.044 mg/l
Sewage treatment plant (STP)	: 1000 mg/l
Fresh water sediment	: 34.6 mg/kg d.w.
Marine sediment	: 3.46 mg/kg d.w.
Soil	: 33.1 mg/kg d.w.

**8.2. Exposure controls****Appropriate engineering controls**

Refer to protective measures listed in sections 7 and 8.

**Personal protective equipment***Respiratory protection*

Advice : Required, if exposure limit is exceeded (e.g. OEL).  
Respiratory protection complying with EN 141.  
Recommended Filter type:  
Particle filter:P2

*Hand protection*

Advice : Protective gloves complying with EN 374.  
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.  
Protective gloves should be replaced at first signs of wear.

Material : Natural Rubber  
Break through time :  $\geq 8$  h  
Glove thickness : 0.5 mm

Material : polychloroprene  
Break through time :  $\geq 8$  h  
Glove thickness : 0.5 mm

Material : Nitrile rubber

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

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

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

Material : Polyvinylchloride  
Break through time :  $\geq 8$  h  
Glove thickness : 0.5 mm

*Eye protection*

Advice : Tightly fitting safety goggles (EN166)

*Skin and body protection*

Advice : Wear personal protective equipment.

**Environmental exposure controls**

General advice : Do not flush into surface water or sanitary sewer system.  
Avoid subsoil penetration.  
If the product contaminates rivers and lakes or drains inform respective authorities.  
If material reaches soil inform authorities responsible for such cases.

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

Form : granular  
Colour : white  
Odour : odourless  
Odour Threshold : Not applicable  
pH : 1.8 ( 25 °C)5% solution  
Melting point/range : 153 °C  
Boiling point/boiling range :  $> 175$  °C

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Flash point	: 345 °C
Evaporation rate	: Not applicable
Flammability (solid, gas)	: Not applicable
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: < 0.001 hPa (20 °C)
Relative vapour density	: no data available
Density	: 1.665 g/cm <sup>3</sup> (20 °C)
Water solubility	: 1450 g/l (20 °C)
Partition coefficient: n-octanol/water	: log K <sub>ow</sub> -1.8 - -0.2
Auto-ignition temperature	: no data available
Thermal decomposition	: > 175 °C
Viscosity, dynamic	: Not applicable
Viscosity, kinematic	: Not applicable
Explosive properties	: EU legislation: Dust may form explosive mixture in air.
Oxidizing properties	: not oxidising

**9.2. Other information**

Molecular weight	: 192.12 g/mol
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**SECTION 10: Stability and reactivity****10.1. Reactivity**

Advice	: No decomposition if stored and applied as directed.
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**10.2. Chemical stability**

Advice	: Stable under recommended storage conditions.
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**10.3. Possibility of hazardous reactions**

Hazardous reactions	: No dangerous reaction known under conditions of normal use.
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**10.4. Conditions to avoid**



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Conditions to avoid : Avoid moisture. Avoid dust formation. Heat, flames and sparks. Risk of dust explosion.

Thermal decomposition : > 175 °C

**10.5. Incompatible materials**

Materials to avoid : Strong bases, Oxidizing agents, Strong acids, Sodium nitrite, Potassium nitrite

**10.6. Hazardous decomposition products**

Hazardous decomposition : Fire may cause evolution of: Carbon oxides products

**SECTION 11: Toxicological information****11.1. Information on toxicological effects**

Component:	Citric acid	CAS-No. 77-92-9
Acute toxicity		
Oral		
LD50	:	5400 mg/kg (Mouse, male and female) (OECD Test Guideline 401)
Inhalation		
No valid data available.		
Dermal		
LD50	:	> 2000 mg/kg (Rat, male and female) (OECD Test Guideline 402)
Irritation		
Skin		
Result	:	No skin irritation (Rabbit) (OECD Test Guideline 404)
Eyes		
Result	:	Irritating to eyes.
Sensitisation		
Result	:	not sensitizing

**CITRIC ACID ANHYDROUS****CMR effects****CMR Properties**

Carcinogenicity	:	It is not considered carcinogenic.
Mutagenicity	:	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects
Teratogenicity	:	Did not show teratogenic effects in animal experiments.
Reproductive toxicity	:	It is not considered toxic for reproduction.

**Genotoxicity in vitro**

Result	:	negative (Bacterial Reverse Mutation Test; Salmonella typhimurium; with and without metabolic activation) (OECD Test Guideline 471)
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**Genotoxicity in vivo**

Result	:	negative (Chromosome aberration test in vivo; Rat, male and female) (Oral; ) (Regulation (EC) No. 440/2008, Annex, B.22) negative (Mammalian Bone Marrow Chromosomal Aberration Test; Rat, male) (Oral; ) (OECD Test Guideline 475)
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**Teratogenicity**

NOAEL Teratog.	:	> 272 mg/kg bw/day (Mouse)(Oral)No adverse effects
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**Specific Target Organ Toxicity****Single exposure**

Remarks	:	no data available
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**Repeated exposure**

Remarks	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
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**Other toxic properties****Repeated dose toxicity**

NOAEL	:	4000 mg/kg bw/day
LOAEL	:	8000 mg/kg bw/day (Rat)(Oral; 10 d)

**CITRIC ACID ANHYDROUS****Aspiration hazard**

Not applicable,

**SECTION 12: Ecological information****12.1. Toxicity**

Component:	Citric acid	CAS-No. 77-92-9
Acute toxicity		
Fish		
LC50	: 440 mg/l (Leuciscus idus melanotus; 48 h) (static test; OECD Test Guideline 203)	
Toxicity to daphnia and other aquatic invertebrates		
LC50	: 1,535 mg/l (Daphnia magna (Water flea); 24 h) (static test)	
algae		
	: no data available	

**12.2. Persistence and degradability**

Component:	Citric acid	CAS-No. 77-92-9
Persistence and degradability		
Persistence		
Result	:	no data available
Biodegradability		
Result	:	97 % (aerobic; Related to: CO2 formation (% of the theoretical value).; Exposure Time: 28 d)(OECD Test Guideline 301B)Readily biodegradable.
Result	:	100 % (aerobic; Related to: Dissolved organic carbon (DOC); Exposure Time: 19 d)(OECD Test Guideline 301E)Readily biodegradable.

**12.3. Bioaccumulative potential**

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<b>Component:</b>	<b>Citric acid</b>	<b>CAS-No. 77-92-9</b>
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### Bioaccumulation

Result : log Kow -1.80 - -1.61  
 : Bioaccumulation is not expected.

#### 12.4. Mobility in soil

<b>Component:</b>	<b>Citric acid</b>	<b>CAS-No. 77-92-9</b>
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### Mobility

Water : The product is water soluble.  
 Air : not volatile

#### 12.5. Results of PBT and vPvB assessment

<b>Component:</b>	<b>Citric acid</b>	<b>CAS-No. 77-92-9</b>
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### Results of PBT and vPvB assessment

Result : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent and very bioaccumulating (vPvB).

#### 12.6. Other adverse effects

### Data for the product

### Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.  
 Avoid subsoil penetration.

Result :

<b>Component:</b>	<b>Citric acid</b>	<b>CAS-No. 77-92-9</b>
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### Additional ecological information

Result : no data available

## SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

Contaminated packaging : Empty contaminated packagings thoroughly. They can be

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recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations.

European Waste  
Catalogue Number

: No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

**SECTION 14: Transport information**

Not dangerous goods for ADR, RID, IMDG and IATA.

**14.1. UN number**

Not applicable.

**14.2. UN proper shipping name**

Not applicable.

**14.3. Transport hazard class(es)**

Not applicable.

**14.4. Packaging group**

Not applicable.

**14.5. Environmental hazards**

Not applicable.

**14.6. Special precautions for user**

Not applicable.

**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

IMDG : Not applicable.

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

Component:	Citric acid	CAS-No. 77-92-9
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EU. Regulation EU No. 649/2012 concerning the export and import of dangerous chemicals : ; The substance/mixture does not fall under this legislation.

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EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.  
Marketing and Use  
Restrictions (Regulation  
1907/2006/EC)

EU. Regulation No : EC Number: , 201-069-1; Listed  
1451/2007 [Biocides],  
Annex I, OJ (L 325)

EU. Directive : ; The substance/mixture does not fall under this legislation.  
2012/18/EU (SEVESO  
III) Annex I

**Notification status****Citric acid:**

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	201-069-1
ENCS (JP)	YES	(2)-1318
ISHL (JP)	YES	(2)-1318
JEX (JP)	YES	(2)-1318
KECI (KR)	YES	KE-20831
NZIOC	YES	HSR003138
PHARM (JP)	YES	
PICCS (PH)	YES	
TSCA	YES	
IECSC	YES	

**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.

**Abbreviations and Acronyms**

**BCF** bioconcentration factor

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<b>BOD</b>	biochemical oxygen demand
<b>CAS</b>	Chemical Abstracts Service
<b>CLP</b>	Classification, Labelling and Packaging
<b>CMR</b>	carcinogenic, mutagenic or toxic to reproduction
<b>COD</b>	chemical oxygen demand
<b>DNEL</b>	derived no-effect level
<b>EINECS</b>	European Inventory of Existing Commercial Chemical Substances
<b>ELINCS</b>	European List of Notified Chemical Substances
<b>GHS</b>	Globally Harmonized System of Classification and Labelling of Chemicals
<b>LC50</b>	median lethal concentration
<b>LOAEC</b>	lowest observed adverse effect concentration
<b>LOAEL</b>	lowest observed adverse effect level
<b>LOEL</b>	lowest observed effect level
<b>NLP</b>	no-longer polymer
<b>NOAEC</b>	no observed adverse effect concentration
<b>NOAEL</b>	no observed adverse effect level
<b>NOEC</b>	no observed effect concentration
<b>NOEL</b>	no observed effect level
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>OEL</b>	occupational exposure limit
<b>PBT</b>	persistent, bioaccumulative and toxic
<b>REACH Auth. No.:</b>	REACH Authorisation Number
<b>REACH AuthAppC. No.</b>	REACH Authorisation Application Consultation Number
<b>PNEC</b>	predicted no-effect concentration
<b>STOT</b>	specific target organ toxicity
<b>SVHC</b>	substance of very high concern
<b>UVCB</b>	substance of unknown or variable composition, complex reaction products or biological materials
<b>vPvB</b>	very persistent and very bioaccumulative

**Further information**

Key literature references : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

Methods used for product classification : The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.

Hints for trainings : The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.

Other information : The information provided in this Safety Data Sheet is

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correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.

The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.



**CITRIC ACID ANHYDROUS**

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	8	19	1, 2, 3, 4, 8b	1	NA	ES10028
2	Formulation & (re)packing of substances and mixtures	3	5, 10, 13, 20	1, 3, 9a, 9b, 12, 18, 30, 31, 35, 39	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 13, 14, 15, 19	1, 2, 3, 4	NA	ES1638
3	Use in polymers and plastic	3	NA	32	3, 5, 8a, 8b	6b	NA	ES2140
4	Use in coatings	3	17, 18, 19	9a, 9b, 18, 34	7, 8a, 8b, 10, 19, 24	5	4, 11	ES2145
5	Use in coatings	21	NA	9a, 9b, 18, 34	NA	8c, 8f, 10a, 10b, 11a, 11b	4, 11	ES2149
6	Use in coatings	22	17, 18, 19	9a, 9b, 18, 34	8a, 8b, 10, 11, 19, 24	8c, 8f, 10a, 10b, 11a, 11b	4, 11	ES2147
7	Use in cleaning agents	3	NA	3, 28, 31, 35, 36, 37	2, 4, 7, 8a, 8b, 9, 10, 13	2, 4	8	ES2064
8	Use in cleaning agents	21	NA	3, 28, 31, 35, 36, 37	NA	8a, 8d, 9a, 9b	NA	ES2097
9	Use in cleaning agents	22	NA	3, 28, 31, 35, 36, 37	1, 4, 8a, 9, 10, 11, 13, 19	8a, 8d, 9a, 9b	NA	ES2068
10	Use in agrochemicals	3	1	8, 12, 21	3, 5, 8a, 8b, 10, 14, 15, 19	4	2	ES2238
11	Use in agrochemicals	21	1	8, 12, 21	NA	8b, 8d	NA	ES2252
12	Use in agrochemicals	22	1	8, 12, 21	3, 5, 8a, 8b, 10, 11, 14, 15, 19	8b, 8d	NA	ES2249
13	Use in laboratories	3	NA	NA	1, 2, 4, 8a	4, 7	NA	ES2190
14	Use in process water treatment	3	14, 15, 16, 17	4, 7, 14, 16, 17, 20, 25, 35, 37	1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 18, 20	4, 7	NA	ES2205
15	Use in oil industry	3	2a, 2b	20, 40	3, 4, 5	4	NA	ES2143
16	Use in metal surface treatment.	3	14, 15, 16, 17	7, 14, 25, 31, 35	2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18, 23	4, 6b	NA	ES2219
17	Use in cosmetics	21	20	2, 39	NA	8a, 11a	8	ES2033
18	Use in cosmetics	22	20	2, 39	10, 11, 19	8a, 11a	8	ES2062
19	Use in paper industry	3	6b	26	5, 8a	4	NA	ES2099
20	Use in photography products	3	20	30	5, 13	4	NA	ES2153
21	Use in photography products	21	20	30	NA	8a	NA	ES2171
22	Use in photography products	22	20	NA	5, 13	8a	NA	ES2159
23	Use as an intermediate	3	9	19	1, 2, 4,	6a	NA	ES1617

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					8b			
24	Use in textile industry	3	5	20, 23, 34	8a, 8b, 10, 13, 22	4	NA	ES2182
25	Use in building and construction work	3	2, 10, 19	NA	4, 5, 7, 8a, 8b, 10, 13, 14, 19, 21, 24	5, 12a	4	ES2113
26	Use in building and construction work	21	2, 10, 19	0, 1, 9b	NA	8c, 8f, 10a, 10b, 11a, 11b	4	ES2138
27	Use in building and construction work	22	2, 10, 19	NA	4, 5, 8a, 8b, 10, 11, 13, 14, 19, 21, 24	8c, 8f, 10a, 10b, 11a, 11b	4	ES2136
28	Use in medical devices	3	20	20	1	7	7	ES11325
29	Use in medical devices	21	20	20	NA	8d	NA	ES11329
30	Use in medical devices	22	20	20	1	8d	NA	ES11327

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 1: Manufacture of substance**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Chemical product category	PC19: Intermediate
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC1: Manufacture of substances

**2.1 Contributing scenario controlling environmental exposure for: ERC1**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
	Regional use tonnage:	10000 ton(s)/year
	Fraction of regional tonnage used locally:	1
	Annual amount per site	10000 ton(s)/year
	Daily amount per site	30000 kg/day
Frequency and duration of use	Continuous exposure	350 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	900
	Dilution Factor (Coastal Areas)	1,000
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0.01 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Do not flush into surface water or sanitary sewer system., Do not release undiluted and unneutralized to the sewer., Regular control of the pH value during introduction into open waters is required.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
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 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration, Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge

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Contain and dispose of waste in accordance with environmental legislation and according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 90%.
	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure duration per day	> 4 h
	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm <sup>2</sup> ) (PROC1, PROC3)
	Exposed skin area	Palms of both hands (480 cm <sup>2</sup> ) (PROC2, PROC4, PROC8b)
	Breathing volume	10 m <sup>3</sup> /day
	Light activity	
	Body weight	70 kg
Technical conditions and measures to control dispersion from source towards the worker	Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation. Dust must be extracted directly at the point of origin. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Avoid splashing.	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Wear protective clothing. LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0153mg/L	0.0348
---	Annual average	Water	PEC	0.0153mg/L	---
---	---	Fresh water sediment	PEC	0.261mg/kg wwt	0.0348
---	---	Marine water	PEC	0.00180mg/L	0.0408
---	Annual average	Marine water	PEC	0.00718mg/L	---
---	---	Marine sediment	PEC	0.0307mg/kg	0.0408

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				wwt	
---	30 days	Agricultural soil	PEC	0.0227mg/kg wwt	0.000777
---	180 days	Agricultural soil	PEC	0.00743mg/kg wwt	---
---	180 days	Grassland	PEC	0.00297mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.000112mg/L	---
---	---	Pore water of grassland	PEC	0.0000448mg/ L	---
---	---	Groundwater under agricultural soil	PEC	0.000112mg/L	---

**Workers**

PROC1, PROC2, PROC3, PROC4, PROC8b: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Dermal	0.3mg/kg/day	---
PROC2	---	Dermal	0.14mg/kg/day	---
PROC3	---	Dermal	0.03mg/kg/day	---
PROC4, PROC8b	---	Dermal	0.69mg/kg/day	---
PROC1	---	Inhalation	0.01mg/m <sup>3</sup>	---
PROC2, PROC3	---	Inhalation	0.1mg/m <sup>3</sup>	---
PROC4	---	Inhalation	2.5mg/m <sup>3</sup>	---
PROC8b	---	Inhalation	1.25mg/m <sup>3</sup>	---

In the ECETOC TRA model, LEV is not considered for PROC1.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 2: Formulation & (re)packing of substances and mixtures**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU20: Health services
Chemical product category	PC1: Adhesives, sealants PC3: Air care products PC9a: Coatings and paints, thinners, paint removers PC9b: Fillers, putties, plasters, modelling clay PC12: Fertilizers PC18: Ink and toners PC30: Photo-chemicals PC31: Polishes and wax blends PC35: Washing and cleaning products PC39: Cosmetics, personal care products
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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) PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC3, ERC4**

Amount used	Amounts used in the EU (tonnes/year)	10000 ton(s)/year
	Regional use tonnage (tons/year):	10000 ton(s)/year
	Fraction of EU tonnage used in region:	0.6
	Annual amount per site	6000 ton(s)/year
	Daily amount per site	20000 kg/day

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Frequency and duration of use	Continuous exposure	300 Emission days
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0.25 %
	Emission or Release Factor: Water	0.05 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Removal of solids in settling tanks, Do not flush into surface water or sanitary sewer system., Do not release undiluted and unneutralized to the sewer., Regular control of the pH value during introduction into open waters is required.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	10,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration, Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC19**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure duration per day	> 4 h
	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm2) (PROC1, PROC3, PROC15)
	Exposed skin area	Palms of both hands (480 cm2) (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14)
	Body weight	70 kg
	Breathing volume	10 m3/day
Technical conditions and measures to control dispersion from source towards the worker	Provide appropriate exhaust ventilation at places where dust is formed. Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Avoid splashing.	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	



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

Butyl rubber gloves offer good protection  
Wear protective clothing.  
Safety glasses  
Wear face protection.  
Avoid contact with the substance or contaminated objects  
Use of PPE will minimize contact during handling.

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0158mg/L	0.0359
---	Annual average	Fresh water	PEC	0.0157mg/L	---
---	---	Fresh water sediment	PEC	0.27mg/kg wwt	0.0359
---	---	Marine water	PEC	0.0194mg/L	0.441
---	Annual average	Marine water	PEC	0.0162mg/L	---
---	---	Marine sediment	PEC	0.331mg/kg wwt	---
---	30 days	Agricultural soil	PEC	0.106mg/kg wwt	0.00362
---	180 days	Agricultural soil	PEC	0.347mg/kg wwt	---
---	180 days	Grassland	PEC	0.0139mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.000523mg/L	---
---	---	Pore water of grassland	PEC	0.000209mg/L	---

**Workers**

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15, PROC19: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Dermal	0.34mg/kg/day	---
PROC2	---	Dermal	0.14mg/kg/day	---
PROC3, PROC15	---	Dermal	0.034mg/kg/day	---
PROC4, PROC8b, PROC9, PROC13	---	Dermal	0.69mg/kg/day	---
PROC5, PROC8a	---	Dermal	1.37mg/kg/day	---
PROC7	---	Dermal	4.29mg/kg/day	---
PROC14	---	Dermal	0.34mg/kg/day	---
PROC19	---	Dermal	14.1mg/kg/day	---
PROC1, PROC13	---	Inhalation	0.01mg/m <sup>3</sup>	---



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PROC2, PROC3	---	Inhalation	0.1mg/m <sup>3</sup>	---
PROC4, PROC5, PROC8b	---	Inhalation	2.5mg/m <sup>3</sup>	---
PROC7	---	Inhalation	10mg/m <sup>3</sup>	---
PROC8a	---	Inhalation	5mg/m <sup>3</sup>	---
PROC9	---	Inhalation	2mg/m <sup>3</sup>	---
PROC14	---	Inhalation	1mg/m <sup>3</sup>	---
PROC15	---	Inhalation	0.5mg/m <sup>3</sup>	---
PROC19	---	Inhalation	0.05mg/m <sup>3</sup>	---

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 3: Use in polymers and plastic**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Chemical product category	PC32: Polymer preparations and compounds
Process categories	PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

**2.1 Contributing scenario controlling environmental exposure for: ERC6b**

Amount used	Amounts used in the EU (tonnes/year)	200 ton(s)/year
	Regional use tonnage (tons/year):	20 ton(s)/year
	Fraction of regional tonnage used locally:	1
	Annual amount per site	20 ton(s)/year
	Daily amount per site	67 kg/day
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0.65 %
	Regional only, .	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC3, PROC5, PROC8a, PROC8b**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 1 %.
	Physical Form (at time of use)	solid, liquid
Technical conditions and	Take measures to prevent the build up of electrostatic charge.	

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measures to control dispersion from source towards the worker	Avoid splashing. Provide adequate ventilation.
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 4: Use in coatings**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18: Manufacture of furniture SU19: Building and construction work
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC9b: Fillers, putties, plasters, modelling clay PC18: Ink and toners PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Process categories	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 PROC10: Roller application or brushing PROC19: Hand-mixing with intimate contact and only PPE available PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles AC11: Wood articles
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix

**2.1 Contributing scenario controlling environmental exposure for: ERC5**

Amount used	Amounts used in the EU (tonnes/year)	300 ton(s)/year
	Regional use tonnage (tons/year):	40 ton(s)/year
	Fraction of regional tonnage used locally:	0.25
	Annual amount for wide disperse uses	10 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC7, PROC8a, PROC8b, PROC10, PROC19, PROC24**

Product characteristics	Physical Form (at time of	solid, liquid
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	use)	
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing. Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Use of PPE will minimize contact during handling.	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 5: Use in coatings**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC9b: Fillers, putties, plasters, modelling clay PC18: Ink and toners PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles AC11: Wood articles
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC10b: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing) ERC11a: Wide dispersive indoor use of long-life articles and materials with low release ERC11b: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

**2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f, ERC10a, ERC10b, ERC11a, ERC11b**

Amount used	Amounts used in the EU (tonnes/year)	300 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	2 %
	local release rate, .	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling consumer exposure for: PC9a, PC9b, PC18, PC34**

Product characteristics	Physical Form (at time of use)	liquid, solid
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Exposure to low concentrations during application/use	

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

No information available.

**CITRIC ACID ANHYDROUS****Consumers**

No information available.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 6: Use in coatings**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18: Manufacture of furniture SU19: Building and construction work
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC9b: Fillers, putties, plasters, modelling clay PC18: Ink and toners PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Process categories	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 PROC10: Roller application or brushing PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles AC11: Wood articles
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC10b: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing) ERC11a: Wide dispersive indoor use of long-life articles and materials with low release ERC11b: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

**2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f, ERC10a, ERC10b, ERC11a, ERC11b**

Amount used	Amounts used in the EU (tonnes/year)	300 ton(s)/year
	Regional use tonnage (tons/year):	40 ton(s)/year
	Fraction of regional tonnage used locally:	0.25
	Annual amount for wide disperse uses	10 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for	Contain and dispose of waste in accordance with environmental legislation and	



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disposal	according to local regulations.
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**2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC10, PROC11, PROC19, PROC24**

Product characteristics	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Use of PPE will minimize contact during handling.	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 7: Use in cleaning agents**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Chemical product category	PC3: Air care products PC28: Perfumes, fragrances PC31: Polishes and wax blends PC35: Washing and cleaning products PC36: Water softeners PC37: Water treatment chemicals
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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
Article categories	AC8: Paper articles
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4**

Readily biodegradable		
Amount used	Amounts used in the EU (tonnes/year)	100000 ton(s)/year
	Regional use tonnage (tons/year):	10000 ton(s)/year
	Fraction of regional tonnage used locally:	0.0005
	Annual amount per site	5000 kg/year
	Daily amount per site	14 kg/day
Frequency and duration of use	Continuous exposure	365 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the	Water	Do not flush into surface water or sanitary sewer system., Do not release undiluted and unneutralized to the sewer., Regular control of the pH value during introduction into open waters is required.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	

**CITRIC ACID ANHYDROUS**

site		
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Onsite sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration, Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations more than 25%
	Physical Form (at time of use)	liquid, solid
Frequency and duration of use	Exposure time	> 4 h
	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm2) (PROC5, PROC8b, PROC13)
	Breathing volume	10 m3/day
	Body weight	70 kg
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC7)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	Butyl rubber gloves offer good protection Safety glasses Wear protective clothing. Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0248mg/L	0.0563
---	Annual average	Fresh water	PEC	0.0248mg/L	---
---	---	Fresh water sediment	PEC	0.423mg/kg wwt	0.0563
---	---	Marine water	PEC	0.00237mg/L	0.0539
---	Annual average	Marine water	PEC	0.00237mg/L	---
---	---	Marine sediment	PEC	0.0405mg/kg wwt	0.0539

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---	30 days	Agricultural soil	PEC	0.402mg/kg wwt	0.0138
---	180 days	Agricultural soil	PEC	0.132mg/kg wwt	---
---	180 days	Grassland	PEC	0.0527mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.00199mg/L	---
---	---	Pore water of grassland	PEC	0.000795mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.00199mg/L	---

**Workers**

PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC7	---	Dermal	2.14mg/kg/day	---
PROC8a	---	Dermal	13.7mg/kg/day	---
PROC8b, PROC9	---	Dermal	6.9mg/kg/day	---
PROC10	---	Dermal	27.4mg/kg/day	---
PROC13	---	Dermal	13.7mg/kg/day	---
PROC7	---	Inhalation	0.71mg/m <sup>3</sup>	---
PROC8a, PROC10	---	Inhalation	0.07mg/m <sup>3</sup>	---
PROC8b, PROC13	---	Inhalation	0.014mg/m <sup>3</sup>	---
PROC9	---	Inhalation	0.01mg/m <sup>3</sup>	---

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 8: Use in cleaning agents**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC3: Air care products PC28: Perfumes, fragrances PC31: Polishes and wax blends PC35: Washing and cleaning products PC36: Water softeners PC37: Water treatment chemicals
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems ERC9b: Wide dispersive outdoor use of substances in closed systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d, ERC9a, ERC9b**

Readily biodegradable		
Amount used	Amounts used in the EU (tonnes/year)	100000 ton(s)/year
	Regional use tonnage (tons/year):	10000 ton(s)/year
	Fraction of regional tonnage used locally:	0.0005
	Annual amount for wide disperse uses	14 kg/day
Frequency and duration of use	Continuous exposure	365 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling consumer exposure for: PC3, PC28, PC31, PC35, PC36,**

**CITRIC ACID ANHYDROUS****PC37**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations more than 25%
	Physical Form (at time of use)	liquid, solid
Human factors not influenced by risk management	Body weight	65 kg
	Breathing volume	26 m3
	Light activity	
	Exposed skin surface	960 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Room size	20 m3
	Ventilation rate per hour	0.6
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Long term exposure to low concentrations during application/use	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0248mg/L	0.0563
---	Annual average	Fresh water	PEC	0.0248mg/L	0.0563
---	---	Fresh water sediment	PEC	0.423mg/kg wwt	0.0563
---	---	Marine water	PEC	0.00237mg/L	0.0539
---	Annual average	Marine water	PEC	0.00237mg/L	0.0539
---	---	Marine sediment	PEC	0.0405mg/kg wwt	0.0539
---	30 days	Agricultural soil	PEC	0.402mg/kg wwt	0.0138
---	180 days	Agricultural soil	PEC	0.132mg/kg wwt	---
---	180 days	Grassland	PEC	0.0527mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.00199mg/L	---
---	---	Pore water of grassland	PEC	0.000795mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.00199mg/L	---

**Consumers**

No information available.

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

**CITRIC ACID ANHYDROUS**

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 9: Use in cleaning agents**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category	PC3: Air care products PC28: Perfumes, fragrances PC31: Polishes and wax blends PC35: Washing and cleaning products PC36: Water softeners PC37: Water treatment chemicals
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions 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 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems ERC9b: Wide dispersive outdoor use of substances in closed systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d, ERC9a, ERC9b**

Readily biodegradable		
Amount used	Amounts used in the EU (tonnes/year)	100000 ton(s)/year
	Regional use tonnage (tons/year):	10000 ton(s)/year
	Fraction of regional tonnage used locally:	0.0005
	Daily amount for wide dispersive uses	14 kg/day
Frequency and duration of use	Continuous exposure	365 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	



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site		
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC4, PROC8a, PROC9, PROC10, PROC11, PROC13, PROC19**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations more than 25%
	Physical Form (at time of use)	liquid, solid
Frequency and duration of use	Exposure time	15 - 30 min
	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm2) (PROC8b, PROC9, PROC13)
	Breathing volume	10 m3/day
	Body weight	70 kg
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0248mg/L	0.0563
---	Annual average	Fresh water	PEC	0.0248mg/L	---
---	---	Fresh water sediment	PEC	0.423mg/kg wwt	0.0563
---	---	Marine water	PEC	0.00237mg/L	0.0539
---	Annual average	Marine water	PEC	0.00237mg/L	---
---	---	Marine sediment	PEC	0.0405mg/kg wwt	0.0539
---	30 days	Agricultural soil	PEC	0.402mg/kg	0.0138

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				wwt	
---	180 days	Agricultural soil	PEC	0.132mg/kg wwt	---
---	180 days	Grassland	PEC	0.0527mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.00199mg/L	---
---	---	Pore water of grassland	PEC	0.000795mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.00199mg/L	---

**Workers**

PROC8a, PROC9, PROC10, PROC11, PROC13, PROC19: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a	---	Dermal	13.7mg/kg/day	---
PROC9	---	Dermal	6.9mg/kg/day	---
PROC10	---	Dermal	27.4mg/kg/day	---
PROC11	---	Dermal	107mg/kg/day	---
PROC13	---	Dermal	13.7mg/kg/day	---
PROC19	---	Dermal	141mg/kg/day	---
PROC8a, PROC10	---	Inhalation	0.07mg/m <sup>3</sup>	---
PROC9	---	Inhalation	0.01mg/m <sup>3</sup>	---
PROC11	---	Inhalation	0.14mg/m <sup>3</sup>	---
PROC13	---	Inhalation	0.014mg/m <sup>3</sup>	---
PROC19	---	Inhalation	0.07mg/m <sup>3</sup>	---

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

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

Assumes a good basic standard of occupational hygiene is implemented. Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 10: Use in agrochemicals**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU1: Agriculture, forestry, fishery
Chemical product category	PC8: Biocidal products (e.g. Disinfectants, pest control) PC12: Fertilizers PC21: Laboratory chemicals
Process categories	PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 PROC10: Roller application or brushing PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Article categories	AC2: Machinery, mechanical appliances, electrical/ electronic articles
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

**2.1 Contributing scenario controlling environmental exposure for: ERC4**

Amount used	Amounts used in the EU (tonnes/year)	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge

**2.2 Contributing scenario controlling worker exposure for: PROC3, PROC5, PROC8a, PROC8b, PROC10, PROC14, PROC15, PROC19**

Product characteristics	Physical Form (at time of use)	solid, liquid
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to	Clean equipment and the work area every day.	

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prevent /limit releases, dispersion and exposure

Provide basic employee training to prevent/minimize exposures

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

In case of inadequate ventilation wear respiratory protection.  
 Wear face protection.  
 Butyl rubber gloves offer good protection  
 LEV and respiratory protection to be taken in areas where workers may come into contact with dust  
 Avoid contact with the substance or contaminated objects

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

No information available.

**Workers**

No information available.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 11: Use in agrochemicals**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU1: Agriculture, forestry, fishery
Chemical product category	PC8: Biocidal products (e.g. Disinfectants, pest control) PC12: Fertilizers PC21: Laboratory chemicals
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8d**

Amount used	Amounts used in the EU (tonnes/year)	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	

**2.2 Contributing scenario controlling consumer exposure for: PC8, PC12, PC21**

Product characteristics	Physical Form (at time of use)	solid, liquid
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable protective clothing, gloves and eye/face protection. Avoid prolonged contact with eyes, skin and clothing. Ensure that no inhalable dusts are generated In case of dust or aerosol formation: use respiratory protection with approved filter (P2) These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes.

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

No information available.

**Consumers**

No information available.

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

**CITRIC ACID ANHYDROUS**

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 12: Use in agrochemicals**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU1: Agriculture, forestry, fishery
Chemical product category	PC8: Biocidal products (e.g. Disinfectants, pest control) PC12: Fertilizers PC21: Laboratory chemicals
Process categories	PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 PROC10: Roller application or brushing PROC11: Non industrial spraying PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8d**

Amount used	Amounts used in the EU (tonnes/year)	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	

**2.2 Contributing scenario controlling worker exposure for: PROC3, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC14, PROC15, PROC19**

Product characteristics	Physical Form (at time of use)	solid, liquid
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection	

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LEV and respiratory protection to be taken in areas where workers may come into contact with dust  
Avoid contact with the substance or contaminated objects

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.



**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 13: Use in laboratories**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure 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
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC7: Industrial use of substances in closed systems

**2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC7**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water  Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	Before discharge into sewage plants the product normally needs to be neutralised.
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC4, PROC8a**

Product characteristics	Physical Form (at time of use)	liquid, solid
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

No information available.

**Workers**

No information available.

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

**CITRIC ACID ANHYDROUS**

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 14: Use in process water treatment**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment	
Chemical product category	PC4: Anti-Freeze and de-icing products PC7: Base metals and alloys PC14: Metal surface treatment products, including galvanic and electroplating products PC16: Heat transfer fluids PC17: Hydraulic fluids PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents PC25: Metal working fluids PC35: Washing and cleaning products PC37: Water treatment chemicals	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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 PROC18: Greasing at high energy conditions PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC7: Industrial use of substances in closed systems	
2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC7		
Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	100 %
	Regional only, .	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to	
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discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC18, PROC20**

Product characteristics	Physical Form (at time of use)	liquid, solid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 15: Use in oil industry**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU2a: Mining, (without offshore industries) SU2b: Offshore industries
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents PC40: Extraction agents
Process categories	PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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)
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

**2.1 Contributing scenario controlling environmental exposure for: ERC4**

Amount used	Amounts used in the EU (tonnes/year)	900 ton(s)/year
	Regional use tonnage (tons/year):	100 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	100 %
	Regional only, .	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC3, PROC4, PROC5**

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 20% - 50%
	Physical Form (at time of use)	liquid, solid
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	

**CITRIC ACID ANHYDROUS**

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

Wear face protection.  
Butyl rubber gloves offer good protection  
LEV and respiratory protection to be taken in areas where workers may come into contact with dust  
Use of PPE will minimize contact during handling.  
In case of inadequate ventilation wear respiratory protection.

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 16: Use in metal surface treatment.**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Chemical product category	PC7: Base metals and alloys PC14: Metal surface treatment products, including galvanic and electroplating products PC25: Metal working fluids PC31: Polishes and wax blends PC35: Washing and cleaning products
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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 PROC17: Lubrication at high energy conditions and in partly open process PROC18: Greasing at high energy conditions PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids

**2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge



**CITRIC ACID ANHYDROUS**

	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.
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**2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18, PROC23**

Product characteristics	Physical Form (at time of use)	liquid, solid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.



**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 17: Use in cosmetics**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU20: Health services
Chemical product category	PC2: Adsorbents PC39: Cosmetics, personal care products
Article categories	AC8: Paper articles
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC11a: Wide dispersive indoor use of long-life articles and materials with low release
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

**2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC11a**

Amount used	Amounts used in the EU (tonnes/year)	750 ton(s)/year
	Regional use tonnage (tons/year):	750 ton(s)/year
	Fraction of regional tonnage used locally:	0.0005
	Daily amount for wide dispersive uses	1.03 kg/day
Frequency and duration of use	Continuous exposure	365 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	900
	Dilution Factor (Coastal Areas)	1,000
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling consumer exposure for: PC2, PC3, PC39**

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Long term exposure to low concentrations during application/use	

**CITRIC ACID ANHYDROUS****3. Exposure estimation and reference to its source****Environment**

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0159mg/m <sup>3</sup>	0.0361
---	Annual average	Fresh water	PEC	0.0159mg/L	0.0361
---	---	Fresh water sediment	PEC	0.271mg/kg wwt	---
---	---	Marine water	PEC	0.00148mg/L	0.0337
---	Annual average	Marine water	PEC	0.00148mg/L	0.0337
---	---	Marine sediment	PEC	0.0253mg/kg wwt	---
---	30 days	Agricultural soil	PEC	0.0302mg/kg wwt	0.00103
---	180 days	Agricultural soil	PEC	0.00989mg/kg wwt	---
---	180 days	Grassland	PEC	0.00395mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.000149mg/L	---
---	---	Pore water of grassland	PEC	0.0000597mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.000149mg/L	---

**Consumers**

No information available.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 18: Use in cosmetics**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU20: Health services
Chemical product category	PC2: Adsorbents PC39: Cosmetics, personal care products
Process categories	PROC10: Roller application or brushing PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available
Article categories	AC8: Paper articles
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC11a: Wide dispersive indoor use of long-life articles and materials with low release
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

**2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC11a**

Amount used	Amounts used in the EU (tonnes/year)	7500 ton(s)/year
	Regional use tonnage:	750 ton(s)/year
	Fraction of regional tonnage used locally:	0.0005
	Daily amount for wide dispersive uses	1.03 kg/day
Frequency and duration of use	Continuous exposure	365 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	900
	Dilution Factor (Coastal Areas)	1,000
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC10, PROC11, PROC19**

Product characteristics	Physical Form (at time of	solid, liquid
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**CITRIC ACID ANHYDROUS**

	use)	
Frequency and duration of use	Exposure duration per day	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide appropriate exhaust ventilation at places where dust is formed.	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0159mg/m <sup>3</sup>	0.0361
---	Annual average	Fresh water	PEC	0.0159mg/L	---
---	---	Fresh water sediment	PEC	0.271mg/kg wwt	0.0361
---	---	Marine water	PEC	0.00148mg/L	0.0337
---	Annual average	Marine water	PEC	0.00148mg/L	0.0337
---	---	Marine sediment	PEC	0.0253mg/kg wwt	0.0337
---	30 days	Agricultural soil	PEC	0.0302mg/kg wwt	0.00103
---	180 days	Agricultural soil	PEC	0.00989mg/kg wwt	---
---	180 days	Grassland	PEC	0.00395mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.000149mg/L	---
---	---	Pore water of grassland	PEC	0.0000597mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.000149mg/L	---

**Workers**

No information available.

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

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

**CITRIC ACID ANHYDROUS**

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 19: Use in paper industry**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products
Chemical product category	PC26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids
Process categories	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
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

**2.1 Contributing scenario controlling environmental exposure for: ERC4**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
	Regional use tonnage (tons/year):	100 ton(s)/year
	Fraction of regional tonnage used locally:	1
	Annual amount per site	100 ton(s)/year
	Daily amount per site	333 kg/day
Frequency and duration of use	Continuous exposure	300 days/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC5, PROC8a**

Product characteristics	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing. Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear face protection.	
	Butyl rubber gloves offer good protection	
	Avoid contact with the substance or contaminated objects	
	Use of PPE will minimize contact during handling. In case of dust or aerosol formation: use respiratory protection with approved	

**CITRIC ACID ANHYDROUS**

filter (P2)

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 20: Use in photography products**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU20: Health services
Chemical product category	PC30: Photo-chemicals
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC4**

Amount used	Amounts used in the EU (tonnes/year)	200 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water  The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	Before discharge into sewage plants the product normally needs to be neutralised.
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC5, PROC13**

Product characteristics	Physical Form (at time of use)	liquid, solid
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

**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. Where other Risk



**CITRIC ACID ANHYDROUS**

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 21: Use in photography products**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU20: Health services
Chemical product category	PC30: Photo-chemicals
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

Amount used	Amounts used in the EU (tonnes/year)	200 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling consumer exposure for: PC30**

Product characteristics	Physical Form (at time of use)	solid, liquid
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Exposure to low concentrations during application/use	

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

No information available.

**Consumers**

No information available.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 22: Use in photography products**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU20: Health services
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

Amount used	Amounts used in the EU (tonnes/year)	200 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water  The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	Before discharge into sewage plants the product normally needs to be neutralised.
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC5, PROC13**

Product characteristics	Physical Form (at time of use)	liquid, solid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

**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. Where other Risk

**CITRIC ACID ANHYDROUS**

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 23: Use as an intermediate**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU9: Manufacture of fine chemicals
Chemical product category	PC19: Intermediate
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

**2.1 Contributing scenario controlling environmental exposure for: ERC6a**

Amount used	Amounts used in the EU (tonnes/year)	12000 ton(s)/year
	Regional use tonnage (tons/year):	3000 ton(s)/year
	Fraction of regional tonnage used locally:	1
	Annual amount per site	3000 ton(s)/year
	Daily amount per site	10000 kg/day
Frequency and duration of use	Continuous exposure	300 Emission days
Environment factors not influenced by risk management	Dilution Factor (River)	40
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0.7 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Do not flush into surface water or sanitary sewer system., Do not release undiluted and unneutralized to the sewer., Regular control of the pH value during introduction into open waters is required.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
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 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration, Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**CITRIC ACID ANHYDROUS****2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC4, PROC8b**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure duration per day	> 4 h
	Frequency of use	1 Times per day
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm <sup>2</sup> ) (PROC1, PROC3)
	Exposed skin area	Palms of both hands (480 cm <sup>2</sup> ) (PROC2, PROC4, PROC8b)
	Body weight	70 kg
	Respiration volume under conditions of use	10 m <sup>3</sup> /day
Technical conditions and measures to control dispersion from source towards the worker	Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation. Dust must be extracted directly at the point of origin. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Avoid splashing.	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %) (PROC2, PROC4)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %) (PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day. Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection Wear protective clothing. LEV and respiratory protection to be taken in areas where workers may come into contact with dust Avoid contact with the substance or contaminated objects Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0154mg/L	0.035
---	Annual average	Fresh water	PEC	0.0154mg/L	0.035
---	---	Fresh water sediment	PEC	0.263mg/kg wwt	0.035
---	---	Marine water	PEC	0.0084mg/L	0.191
---	Annual average	Marine water	PEC	0.00716mg/L	---
---	---	Marine sediment	PEC	0.144mg/kg wwt	0.191
---	30 days	Agricultural soil	PEC	0.0411mg/kg wwt	0.00141
---	180 days	Agricultural soil	PEC	0.0135mg/kg	---

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				wwt	
---	180 days	Grassland	PEC	0.00539mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.000203mg/L	---
---	---	Pore water of grassland	PEC	0.0000813mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.000203mg/L	---

**Workers**

PROC1, PROC2, PROC3, PROC4, PROC8b: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Dermal	0.3mg/kg/day	---
PROC2	---	Dermal	0.14mg/kg/day	---
PROC3	---	Dermal	0.03mg/kg/day	---
PROC4, PROC8b	---	Dermal	0.69mg/kg/day	---
PROC1	---	Inhalation	0.01mg/m <sup>3</sup>	---
PROC2	---	Inhalation	0.1mg/m <sup>3</sup>	---
PROC3	---	Inhalation	0.01mg/m <sup>3</sup>	---
PROC4	---	Inhalation	2.5mg/m <sup>3</sup>	---
PROC8b	---	Inhalation	1.25mg/m <sup>3</sup>	---

In the ECETOC TRA model, LEV is not considered for PROC1.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 24: Use in textile industry**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents PC23: Leather treatment products PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Process categories	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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC22: Manufacturing and processing of minerals and/or metals at substantially elevated temperature
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

**2.1 Contributing scenario controlling environmental exposure for: ERC4**

Readily biodegradable		
Amount used	Amounts used in the EU (tonnes/year)	300 ton(s)/year
	Fraction of regional tonnage used locally:	0.05
	Regional use tonnage (tons/year):	120 ton(s)/year
	Annual amount per site	6000 kg/year
	Daily amount per site	20 kg/day
Frequency and duration of use	Continuous exposure	300 Emission days
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	100 %
	Based on the applied operational conditions, emission in the air and soil compartment are negligible, .	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Do not flush into surface water or sanitary sewer system., Do not release undiluted and unneutralized to the sewer., Regular control of the pH value during introduction into open waters is required.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for	Waste treatment	Solid wastes should be disposed of via landfill or incineration, Waste water treatment may vary at



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disposal		different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC10, PROC13, PROC22**

Product characteristics	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust Use of PPE will minimize contact during handling.	

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

EUSES 2.1.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0.0292mg/L	0.0663
---	Annual average	Fresh water	PEC	0.0267mg/L	---
---	---	Fresh water sediment	PEC	0.498mg/kg wwt	0.0663
---	---	Marine water	PEC	0.101mg/L	2.3
---	Annual average	Marine water	PEC	0.0835mg/L	---
---	---	Marine sediment	PEC	1.73mg/kg wwt	2.3
---	30 days	Agricultural soil	PEC	0.587mg/kg wwt	0.0201
---	180 days	Agricultural soil	PEC	0.193mg/kg wwt	---
---	180 days	Grassland	PEC	0.0770mg/kg wwt	---
---	---	Pore water of agricultural soil	PEC	0.00291mg/L	---
---	---	Pore water of grassland	PEC	0.00116mg/L	---
---	---	Groundwater under agricultural soil	PEC	0.00291mg/L	---

Direct discharge to the marine environment is unlikely for this use.

**Workers**

No information available.

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the**

**CITRIC ACID ANHYDROUS****Exposure Scenario**

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 25: Use in building and construction work**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU2: Mining, (including offshore industries) SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU19: Building and construction work
Process categories	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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC19: Hand-mixing with intimate contact and only PPE available PROC21: Low energy manipulation of substances bound in materials and/ or articles PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix ERC12a: Industrial processing of articles with abrasive techniques (low release)

**2.1 Contributing scenario controlling environmental exposure for: ERC5, ERC12a**

Amount used	Regional use tonnage (tons/year):	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC14, PROC19, PROC21, PROC24**

Product characteristics	Concentration of the	Covers percentage substance in the product up to 1
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	Substance in Mixture/Article	%.
	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing. Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection LEV and respiratory protection to be taken in areas where workers may come into contact with dust	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 26: Use in building and construction work**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU2: Mining, (including offshore industries) SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU19: Building and construction work
Chemical product category	PC0: Other PC1: Adhesives, sealants PC9b: Fillers, putties, plasters, modelling clay
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC10b: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing) ERC11a: Wide dispersive indoor use of long-life articles and materials with low release ERC11b: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

**2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f, ERC10a, ERC10b, ERC11a, ERC11b**

Amount used	Regional use tonnage (tons/year):	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Contain and dispose of waste in accordance with environmental legislation and according to local regulations.	

**2.2 Contributing scenario controlling consumer exposure for: PC0, PC1, PC9b**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 1 %.
	Physical Form (at time of use)	liquid, solid
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Long term exposure to low concentrations during application/use	

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

**CITRIC ACID ANHYDROUS****Environment**

No information available.

**Consumers**

No information available.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 27: Use in building and construction work**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU2: Mining, (including offshore industries) SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU19: Building and construction work
Process categories	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 PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC19: Hand-mixing with intimate contact and only PPE available PROC21: Low energy manipulation of substances bound in materials and/ or articles PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC10b: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing) ERC11a: Wide dispersive indoor use of long-life articles and materials with low release ERC11b: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

**2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f, ERC10a, ERC10b, ERC11a, ERC11b**

Amount used	Regional use tonnage (tons/year):	1500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	90 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related	Contain and dispose of waste in accordance with environmental legislation and	

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to external treatment of waste for disposal	according to local regulations.
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**2.2 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC14, PROC19, PROC21, PROC24**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 1 %.
	Physical Form (at time of use)	solid, liquid
Frequency and duration of use	Exposure time	> 4 h
Technical conditions and measures to control dispersion from source towards the worker	Take measures to prevent the build up of electrostatic charge. Avoid splashing.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Supervision in place to check that the RMMs in place are being used correctly and OC's followed	
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection. Wear face protection. Butyl rubber gloves offer good protection	

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

No information available.

**Workers**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.



**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 28: Use in medical devices**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU20: Health services
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Article categories	AC7: Metal articles
Environmental Release Categories	ERC7: Industrial use of substances in closed systems
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

**2.1 Contributing scenario controlling environmental exposure for: ERC7**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water  Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	Before discharge into sewage plants the product normally needs to be neutralised.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1**

Product characteristics	Physical Form (at time of use)	solid, liquid
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing. Clear spills immediately. Provide local exhaust ventilation (LEV). Take measures to prevent the build up of electrostatic charge. Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Regular cleaning of equipment and work area Ensure operatives are trained to minimise exposures. Supervision in place to check that the RMMs in place are being used correctly and OC's followed Ensure that eyewash stations and safety showers are close to the workstation location.	
Conditions and measures related to personal protection, hygiene and health evaluation	Appropriate dust respiratory protection In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection Use suitable eye protection and gloves. Wear safety goggles. or Face-shield Avoid contact with contaminated tools and objects Use of PPE will minimize contact during handling.	

**CITRIC ACID ANHYDROUS****3. Exposure estimation and reference to its source****Environment**

Qualitative approach used to conclude safe use.

**Workers**

No exposure assessment presented for human health.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 29: Use in medical devices**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU20: Health services
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents
Environmental Release Categories	ERC8d: Wide dispersive outdoor use of processing aids in open systems
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

**2.1 Contributing scenario controlling environmental exposure for: ERC8d**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling consumer exposure for: PC20**

Readily biodegradable, Does not bioaccumulate.

Product characteristics	Physical Form (at time of use)	solid, liquid
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**3. Exposure estimation and reference to its source****Environment**

Qualitative approach used to conclude safe use.

**Consumers**

No exposure assessment presented for human health.

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

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

Assumes a good basic standard of occupational hygiene is implemented.

**CITRIC ACID ANHYDROUS****1. Short title of Exposure Scenario 30: Use in medical devices**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU20: Health services
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Environmental Release Categories	ERC8d: Wide dispersive outdoor use of processing aids in open systems
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

**2.1 Contributing scenario controlling environmental exposure for: ERC8d**

Amount used	Amounts used in the EU (tonnes/year)	1000 ton(s)/year
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Before discharge into sewage plants the product normally needs to be neutralised.
	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1**

Product characteristics	Physical Form (at time of use)	solid, liquid
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing. Clear spills immediately. Provide local exhaust ventilation (LEV). Take measures to prevent the build up of electrostatic charge. Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Regular cleaning of equipment and work area Ensure operatives are trained to minimise exposures. Supervision in place to check that the RMMs in place are being used correctly and OC's followed Ensure that eyewash stations and safety showers are close to the workstation location.	
Conditions and measures related to personal protection, hygiene and health evaluation	Appropriate dust respiratory protection In case of odour, gas alarm or insufficient ventilation wear suitable respiratory protection Use suitable eye protection and gloves. Wear safety goggles. or Face-shield Avoid contact with contaminated tools and objects Use of PPE will minimize contact during handling.	

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

**CITRIC ACID ANHYDROUS****Environment**

Qualitative approach used to conclude safe use.

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

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

Assumes a good basic standard of occupational hygiene is implemented.