

PRODUCT SAFETY DATA SHEET for Oxalic acid

prepared in accordance with Annex II of the REACH Regulation EC 1907/2006,
Regulation (EC) 1272/2008 and Regulation (EC) 453/2010

Version: 1.1/EN

Revision date: November / 2010

Printing Date: January 17, 2011

1 IDENTIFICATION OF THE SUBSTANCE/mixture AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Substance name: Oxalic acid
Synonyms: *Ethanedioic acid*

Chemical name and formula: Oxalic acid dihydrated– $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$
Trade name: *Oxalic Acid*
CAS: 6153-56-6
EINECS: 205-634-3
Molecular Weight: 126.07 g/mol
REACH Registration number: 01-2119534576-33-0000

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

Please check the identified uses in table 1 of the Appendix of this SDS.

Uses advised against: There are no uses advised against.

1.3 Details of the supplier of the safety data sheet

Name: **OXAQUIM, S.A.**
Address: **C/. Gregal, 3 – Urb. Parc Llevant – 43764 EL CATLLAR (Spain)**
Phone N°: **+34 977 65 38 98**
Fax N°: **+34 977 65 39 30**
E-mail of competent person responsible for SDS in the MS or in the EU: **marcmiquel@oxaquim.com/agarvin@oxaquim.com**

1.4 Emergency telephone number

European Emergency N°: 112
National centre for Prevention and Treatment of Intoxications N°: 91 562 04 20
Emergency telephone at the company: **+34 977 65 38 98**
Available outside office 24 hours: ☐ Yes ☒ No

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2 HAZARDS IDENTIFICATION

2.1 Classification of the substance

2.1.1 Classification according to Regulation (EC) 1272/2008

Acute toxicity cat 4 oral and dermal

Eye Damage 1

2.1.2 Classification according to Directive 67/548/EEC

Xn – harmful

2.2 Label elements

2.2.1 Labelling according to Regulation (EC) 1272/2008

Signal word: Danger

Hazard pictogram:



Hazard statements:

H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H318: Causes serious eye damage.

Precautionary statements:

P280: Wear protective gloves/protective clothing/eye protection/face protection.
P264: Wash thoroughly after handling.
P305 + P351 + P310: IF IN EYES: Rinse cautiously with water for several minutes. Immediately call a POISON CENTER or doctor/physician.
P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P501: Dispose of contents/container to hazardous waste collection point.

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2.2.2 Labelling according to Directive 67/548/EEC

Indication of danger:

Xn harmful



Risk phrases:

R21/22: Harmful in contact with skin and if swallowed.

R41: Risk of serious damage to eyes

Safety phrases:

S2: Keep out of the reach of children

S24/25: Avoid contact with skin and eyes.

2.3 Other hazards

The substance does not meet the criteria for PBT or vPvB substance.

No other hazards identified.

3 COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Main constituent

Name: Oxalic acid dihydrated

CAS: 6153-56-6

EINECS: 205-634-3

Impurities

No impurities relevant for classification and labelling

4 FIRST AID MEASURES

4.1 Description of first aid measures

General advice

In case of loss of consciousness, never provide drink or induce vomiting.

Following inhalation

Move source of dust or move person to fresh air and rest.

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Following skin contact

Carefully and gently brush the contaminated body surfaces in order to remove all traces of product for at least 15 minutes. Wash affected area immediately with plenty of water. Remove contaminated clothing. If necessary seek medical advice.

Following eye contact

Rinse eyes immediately with plenty of water for at least 15 minutes and seek medical advice.

After ingestion

Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Prolonged or repeated skin contact may cause dermatitis. If inhaled can cause a burning sensation of nose and throat, coughing, shortness of breath, sore throat, symptoms of immediate effects.

4.3 Indication of any immediate medical attention and special treatment needed

Follow the advises given in section 4.1

5 FIREFIGHTING MEASURES

5.1 Extinguishing media

5.1.1 Suitable extinguishing media

Use Water spray, powder , foam or carbon dioxide as extinguishing media. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.1.2 Unsuitable extinguishing media

Avoid open flame. Avoid contact with oxidizing materials.

5.2 Special hazards arising from the substance or mixture

Keep away from sources of ignition. In case of fire toxic fumes may form CO, CO₂.

5.3 Advice for fire fighters

The fire fighting equipment must use individual breathing equipment. In case of fire keep cool by spraying with water. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Ensure adequate ventilation.

Keep dust levels to a minimum.

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Keep unprotected persons away.

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).

6.1.2 For emergency responders

Keep dust levels to a minimum.

Ensure adequate ventilation.

Keep unprotected persons away.

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).

6.2 Environmental precautions

Contain the spillage. Keep the material dry if possible. Cover area if possible to avoid unnecessary dust hazard. Avoid uncontrolled spills to watercourses and drains. Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.

6.3 Methods and material for containment and cleaning up

Collect up dry and deposit in waste containers for later disposal according to regulations. Wipe off with water. (Extra personal protection: P2 filter respirator for harmful particles).

6.4 Reference to other sections

For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 and the annex of this safety data sheet.

7 HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Wear protective equipment (refer to section 8 of this safety data sheet). Do not wear contact lenses when handling this product. Keep dust levels to a minimum. Minimize dust generation. Enclose dust sources, use exhaust ventilation.

7.2 Conditions for safe storage, including any incompatibilities

The substance should be stored under dry conditions. Recipients tightly closed. Room temperature. Separated from strong bases, oxidizing materials, food and feed.

7.3 Specific end use(s)

Please check the identified uses in table 1 of the Appendix of this SDS.

For more information please see the relevant exposure scenario, available via your supplier/given in the Appendix.

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8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

OEL (TWA): 1 mg/m³ (ACGIH 1990-1991).

OEL (como STEL): 2 mg/m³ (ACGIH 1990-1991).

DNEL for workers:

Local effects - acute: DNEL (derived not effect level) dermal: 0.69 mg / cm²

Systemic effects - long term: DNEL (derived not effect level) dermal: 2.29 mg / kg bw / day

Systemic effects - long term: DNEL (derived not effect level) inhalation: 4.03 mg / m³

DNEL for the general population:

Local effects - acute: DNEL (derived not effect level) Dermal: 0.35 mg / cm²

Systemic effects - long term: DNEL (derived not effect level) Dermal: 1.14 mg / kg bw / day

Systemic effects - long term: DNEL (derived not effect level) Oral: 1.14 mg / m³

PNEC water (freshwater): 0.1622 mg / L

PNEC water (sea water): 0.01622

PNEC water (intermittent spills): 1,622 mg / L

8.2 Exposure controls

To control potential exposures, generation of dust should be avoided. Further, appropriate protective equipment is recommended. Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.

Please check the relevant exposure scenario, given in the Appendix/available via your supplier.

8.2.1 Appropriate engineering controls

If user operations generate dust, use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne dust levels below recommended exposure limits.

8.2.2 Individual protection measures, such as personal protective equipment

8.2.2.1 Eye/face protection

Do not wear contact lenses. Tight fitting goggles with side shields, or wide vision full goggles.

8.2.2.2 Skin protection

Dermal exposure should be minimized to the extent technically feasible. Wear suitable gloves (nitrile, neoprene, natural rubber, polyvinyl), standard work clothes, long pants, long sleeves, coveralls, closing with accessories and shoes openings resistant to corrosive chemicals and prevent penetration of dust.

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8.2.2.3 Respiratory protection

Local ventilation to keep levels below established threshold values is recommended. A suitable particle filter mask is recommended, depending on the expected exposure levels - please check the relevant exposure scenario, given in the Appendix/available via your supplier.

8.2.2.4 Thermal hazards

The substance does not represent a thermal hazard, thus special consideration is not required.

8.2.3 Environmental exposure controls

Avoid releasing to the environment.

Contain the spillage. Any large spillage into watercourses must be alerted to the regulatory authority responsible for environmental protection or other regulatory body.

For detailed explanations of the risk management measures that adequately control exposure of the environment to the substance please check the relevant exposure scenario, available via your supplier.

For further detailed information, please check the Appendix of this SDS.

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	uncoloured crystals or white powder
Odour:	odourless
Odour threshold:	not applicable
pH:	~0,7(50g/l)
Melting point:	not applicable (sublimes at > 160 °C)
Boiling point:	not applicable (sublimes at > 160 °C)
Flash point:	not applicable
Evaporation rate:	not applicable
Flammability:	non flammable (study result, EU A.10 method)
Explosive limits:	non explosive (void of any chemical structures commonly associated with explosive properties)
Vapour pressure:	0.0312 Pa at 25°C
Vapour density:	not applicable
Relative density:	0.813 (study result, EU A.3 method)
Solubility in water:	108 g/L at 25°C (study results)
Partition coefficient:	- 1.7 at 23°C (study result, OECD Guideline 107)
Auto ignition temperature:	no relative self-ignition temperature below 400 °C (study result, EU A.16 method)
Decomposition temperature:	> 160 °C
Viscosity:	not applicable
Oxidising properties:	no oxidising properties

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9.2 Other information

Not available

10 STABILITY AND REACTIVITY

10.1 Reactivity

On contact with hot surfaces or flames this substance decomposes forming formic acid, carbon monoxide and carbon dioxide. The solution in water is a medium strong acid.

10.2 Chemical stability

Under normal conditions of use and storage, oxalic acid is stable.

10.3 Possibility of hazardous reactions

Reacts violently with strong oxidants causing fire and explosion hazard. Reacts with some silver compounds to form explosive silver oxalate. Attacks some forms of plastic.

10.4 Conditions to avoid

Minimise exposure to air and moisture to avoid degradation.

10.5 Incompatible materials

Alkaline solutions. Ammonia. Halogenates. Oxidizing agents. Metals. Water. / Heat.

10.6 Hazardous decomposition products

Formic acid. Carbon dioxide. Carbon monoxide.

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Oxalic acid is classified as harmful by oral and dermal route and it entails a risk of serious damage to the eye.

11.2 Toxicity endpoints and outcome of the effects assessment

Absorption: The primary health effect of oxalic acid is local irritation due to a pH shift. Therefore, absorption is not a relevant parameter for the effects assessment.

Acute toxicity: Oxalic acid is Oral and Dermal Acutely toxic cat. 4.

Oral: LD50 > 375 mg/kg bw (according to the method of Smyth, rat)

Dermal: LD50 > 20000 mg/kg bw (Pesticide Action Network, North America, rabbit)

Inhalation: no data available

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Classification for acute toxicity is category 4 for oral and dermal route.

Irritation / corrosion

Eye irritation: Oxalic acid entails a risk of serious damage to the eye (OECD 405, rabbit).

Skin irritation: Oxalic acid is not irritating to skin (OECD 404, rabbit).

Based on experimental results, oxalic acid requires classification as severely irritating to the eye [R41, Risk of serious damage to eye; Eye Damage 1 (H318 - Causes serious eye damage)].

Sensitisation: Oxalic acid is not a skin sensitizer (OECD Guideline 429 (Skin Sensitisation: Local Lymph Node Assay)).

Repeated dose toxicity

Toxicity of oxalic acid via the oral route is addressed by LOAEL of 150 mg/kg bw/day.

Toxicity of Oxalic acid via the dermal route is not considered as relevant in view of the anticipated insignificant absorption through skin.

Toxicity of Oxalic acid via inhalation is not considered as relevant.

Therefore, classification of Oxalic acid for toxicity upon prolonged exposure is not required.

Mutagenicity

Bacterial reverse mutation assay (Ames test, OECD 471): Negative

Mammalian chromosome aberration test: Negative

Oxalic acid is void of any genotoxic potential.

Classification for genotoxicity is not warranted.

Carcinogenicity

Oxalic acid is not considered as carcinogenic.

Human epidemiological data support lack of any carcinogenic potential of oxalic acid.

Classification for carcinogenicity is not warranted.

Toxicity for reproduction

Oxalic acid is not toxic to reproduction (experimental result, mouse).

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Human epidemiological data support lack of any potential for reproductive toxicity of oxalic acid.

Classification for reproductive toxicity according to regulation (EC) 1272/2008 is not required.

12 ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute/Prolonged toxicity to fish

LC50 (96h) for freshwater fish: 160 mg/l (Deutsche Einheitsverfahren zur Wasser, Abwasser und Schlamm-Untersuchung)

12.1.2 Acute/Prolonged toxicity to aquatic invertebrates

EC50 (48h) for freshwater invertebrates: 162.2mg/l (OECD 202, Daphnia)

12.1.3 Acute/Prolonged toxicity to aquatic plants

Toxicity threshold (8 days) for freshwater algae: 80.0 mg/l

12.1.4 Chronic toxicity to aquatic organisms

The long-term aquatic toxicity study on aquatic invertebrates shall be considered if the substance is poorly water soluble and oxalic acid is soluble in water. Also oxalic acid presents a low toxicity for the short term test.

12.1.5 Toxicity to soil dwelling organisms

The oxalic acid is not supposed to be directly applied to soil and an indirect exposure to soil via sewage sludge transfer is unlikely since the substance is readily biodegradable. As oxalic acid is considered as "readily biodegradable", it can be assumed that it will be biodegraded within the STP process and as a consequence a transfer to the soil compartment is not expected. Therefore, no tests on terrestrial organisms are provided.

12.1.6 Toxicity to terrestrial plants

EC50 (72 h) for terrestrial plants: 8 mM

12.1.7 General effect

Oxalic acid has a low logKow and is readily biodegradable. The substance is not classified as hazardous for the environment.

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12.2 Persistence and degradability

Oxalic acid is readily biodegradable, meeting the 10-d window. The biodegradation in seawater occurs at the same rate. Also the anaerobic biodegradation occurs rapidly.

12.3 Bio accumulative potential

Not relevant for oxalic acid because this substance is ready biodegradable and highly soluble in water, and LogKow is negative.

12.4 Mobility in soil

Transport through the medium is rate-limiting. Degradation after 30 days at 20°C is up to 73% (based on CO₂ evolution). Oxalic acid is easily biodegradable in soil.

12.5 Results of PBT and vPvB assessment

The hazard assessment of oxalic acid reveals neither a need to classify the substance as dangerous to the environment, nor is it a PBT or vPvB substance, nor are there any further indications that the substance may be hazardous to the environment.

12.6 Other adverse effects

No other adverse effects are identified

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal of oxalic acid should be in accordance with local and national legislation. Processing, use or contamination of this product may change the waste management options. Must not be disposed together with household garbage. Do not allow product to reach sewage system.

Dispose of container and unused contents in accordance with federal, state and local requirements. The used packing is only meant for packing this product. After usage, empty the packing completely.

14 TRANSPORT INFORMATION

Oxalic acid is not classified as hazardous for transport (ADR (Road), RID (Rail), IMDG / GGVSea (Sea).

14.1 UN-Number

Not regulated

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14.2 UN proper shipping name

Not regulated

14.3 Transport hazard class(es)

Not regulated

14.4 Packing group

Not regulated

14.5 Environmental hazards

None

14.6 Special precautions for user

none

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not regulated

15 REGULATORY INFORMATION

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

Authorisations: Not required

Restrictions on use: None

Other EU regulations: Oxalic acid is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.

National regulations: --

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

16 OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

16.1 Hazard Statement

H302: Harmful if swallowed.

H312: Harmful in contact with skin.

H318: Causes serious eye damage.

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16.2 Precautionary Statement

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P264: Wash thoroughly after handling.

P305 + P351 + P310: IF IN EYES: Rinse cautiously with water for several minutes. Immediately call a POISON CENTER or doctor/physician.

P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

P501: Dispose of contents/container to hazardous waste collection point.

16.3 Risk Phrases

R21/22: harmful in contact with skin and if swallowed

R41: risk of serious damage to eyes

16.4 Safety Phrases

S2: Keep out of the reach of children

S24/25 - avoid contact with skin and eyes

16.5 Abbreviations

EC₅₀: median effective concentration

LC₅₀: median lethal concentration

LD₅₀: median lethal dose

LOAEL: lowest observed adverse effect level

OEL: occupational exposure limit

PBT: persistent, bio accumulative, toxic chemical

PNEC: predicted no-effect concentration

STEL: short-term exposure limit

TWA: time weighted average

vPvB: very persistent, very bio accumulative chemical

16.6 Revision

The last revision (November 2010) has involved changes in all the sections, according to the new information obtained from the REACH dossier.

Disclaimer

This safety data sheet (SDS) is based on the legal provisions of the REACH Regulation (EC 1907/2006; article 31 and Annex II), as amended. Its contents are intended as a guide to the

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appropriate precautionary handling of the material. It is the responsibility of recipients of this SDS to ensure that the information contained therein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. Information and instructions provided in this SDS are based on the current state of scientific and technical knowledge at the date of issue indicated. It should not be construed as any guarantee of technical performance, suitability for particular applications, and does not establish a legally valid contractual relationship. This version of the SDS supersedes all previous versions.

ANNEX

Addition of exposure Scenarios as applicable

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APPENDIX: EXPOSURE SCENARIOS

The current document includes all relevant occupational and environmental exposure scenarios (ES) for the production and use of oxalic acid as required under the REACH Regulation (Regulation (EC) No 1907/2006). For the development of the ES the Regulation and the relevant REACH Guidance have been considered. For the description of the covered uses and processes, the "R.12 – Use descriptor system" guidance (Version: 2, March 2010, ECHA-2010-G-05-EN), for the description and implementation of risk management measures (RMM) the "R.13 – Risk management measures" guidance (Version: 1.1, May 2008), for the occupational exposure estimation the "R.14 – Occupational exposure estimation" guidance (Version: 2, May 2010, ECHA-2010-G-09-EN) and for the actual environmental exposure assessment the "R.16 – Environmental Exposure Assessment" (Version: 2, May 2010, ECHA-10-G-06-EN) was used.

The exposure assessment of oxalic acid professional and industrial and consumer use is performed and organized based on several scenarios. An overview of the scenarios and the coverage of substance life cycle is presented in Table 1.

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Table 1: Overview on exposure scenarios and coverage of substance life cycle

ES number	ES name	Manufacture	Identified uses			Resulting life cycle stage		Sector of use (SU)	Chemical product Category (PC)	Process Category (PROC)	Article category (AC)	ERC
			Formulation	End use	Consumer use	Service life for articles	Waste stage					
1	Industrial uses of aqueous solutions of oxalic acid	X	X	X				SU3, SU5, SU6a, SU6b, SU8, SU9, SU10, SU13, SU14, SU16, SU17, SU18, SU19, SU20, SU23, SU0	PC0, PC7, PC9, PC10, PC14, PC15, PC19, PC20, PC21, PC23, PC32, PC34, PC35, PC36, PC37	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15		ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b
2	Industrial uses of solid oxalic acid	X	X	X				SU3, SU5, SU6a, SU6b, SU8, SU9, SU10, SU13, SU14, SU16, SU17, SU18, SU19, SU20, SU23, SU0	PC0, PC7, PC9, PC10, PC14, PC15, PC19, PC20, PC21, PC23, PC32, PC34, PC35, PC36, PC37	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC21, PROC22		ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b
3	Professional uses of aqueous solutions of oxalic acid		X	X				SU22, SU6a, SU18	PC9a, PC14, PC15, PC25, PC35, PC31	PROC10, PROC11, PROC15, PROC21		ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f

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ES number	ES name	Manufacture	Identified uses			Resulting life cycle stage		Sector of use (SU)	Chemical product Category (PC)	Process Category (PROC)	Article category (AC)	ERC
4	Professional uses of solid oxalic acid		X	X				SU22, SU6a, SU18	PC9a, PC14, PC15, PC25, PC35, PC31	PROC10, PROC11, PROC15, PROC21		ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f
5	Consumer use of formulation containing Ox. Acc.			X	X			SU21	PC35, PC9a, PC31	PROC 21		ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f

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9.1. Industrial uses of aqueous solutions of oxalic acid

9.1.1. Exposure scenario

1. Title			
Free short title	Use of aqueous solutions of oxalic acid		
ES number	1		
Systematic title based on use descriptor	SU3, SU5 SU6a, SU6b SU8, SU9, SU10, SU13, SU14, SU16, SU17, SU18, SU19, SU20, SU23, SU0 PC0, PC7, PC9, PC10, PC14, PC 15, PC19, PC20, PC21, PC23, PC32, PC35, PC36, PC37, PC34 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.		
Assessment Method	The assessment of inhalation, dermal and environmental exposure and is based on ECETOC TRA.		
2. Operational conditions and risk management measures			
PROC	REACH definition	Involved tasks	
PROC1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN, 26/03/2010).	
PROC2	Use in closed, continuous process with occasional controlled exposure		
PROC3	Use in closed batch process (synthesis or formulation)		
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises		
PROC5	Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant con-tact)		
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		
PROC15	Use as laboratory reagent		
ERC 1-6b	Manufacture, formulation and all types of industrial uses		
2.1 Control of workers exposure			
Product characteristics			
PROC	Used in preparation?	Content in preparation	Emission potential
PROC 7	Not excluded	> 25 % w/w (not restricted)	Medium
All other applicable PROCs	Not excluded	> 25 % w/w (not restricted)	Low
Amounts used			
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation, (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of			

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the process intrinsic emission potential.				
Frequency and duration of use/exposure				
All applicable PROCs	> 4 hours (not restricted)			
Technical conditions and measures at process level (source) to prevent release				
Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.				
Technical conditions and measures to control dispersion from source towards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to ECTOC TRA)	Further information
All applicable PROCs	Separation of workers is generally not required in the processes, unless a specific process step is conducted less than full-shift. If that is the case, it has to be guaranteed that the worker is separated from the emission source for the remaining shift.	local exhaust ventilation (LEV) (*The use of LEV is not mandatory for PROC1, PROC2 and PROC3, , but it is recommended)	N/A	
Organisational measures to prevent /limit releases, dispersion and exposure				
Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.				
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	Specification of RPE and efficiency	Specification of gloves	Specification of eye protection	Further PPE
PROC 7	Use of respiratory protection with minimum efficiency 90%	Use suitable gloves (Nitrile, Neoprene, Natural rubber, Polyvinyl chloride, natural rubber: Permeation Breakthrough > 360).	As oxalic acid is irritating to eyes, the use of face shield or eye protection is a prerequisite for all process steps.	standard working clothes
All other applicable PROCs	Not required	Protective clothing.		
2.2 Control of environmental exposure				
Amounts used				
The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.				
Frequency and duration of use				
Intermittent (< 12 time per year) or continuous use/release				
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil				
Risk management measures related to the environment aim to avoid discharging oxalic acid solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation).				
Conditions and measures related to waste				
Solid industrial waste of oxalic acid should be reused or discharged to the industrial wastewater and further neutralized if needed.				
3. Exposure estimation and reference to its source				
Occupational exposure				
ECTOC TRA was used for the inhalation and dermal exposure assessment. The risk characterisation ratio (RCR) for inhalation exposure is				

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based on the DNEL_{inhalation} for oxalic acid of 2.29 mg.kg⁻¹ day⁻¹. The risk characterisation ratio (RCR) for dermal exposure is based on the DNEL_{dermal} for oxalic acid of 4.03 mg.kg⁻¹ day⁻¹

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate mg/m3 (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate mg/kg/day (RCR)
PROC1	ECTOC TRA	0.038 (0.002)	ECTOC TRA	0.034 (0.009)
PROC2	ECTOC TRA	0.375 (0.023)	ECTOC TRA	0.137 (0.034)
PROC3	ECTOC TRA	1.125 (0.070)	ECTOC TRA	0.034 (0.009)
PROC4	ECTOC TRA	1.876 (0.117)	ECTOC TRA	0.686 (0.170)
PROC5	ECTOC TRA	1.876 (0.117)	ECTOC TRA	0.069 (0.017)
PROC7	ECTOC TRA	1.876 (0.117)	ECTOC TRA	2.143 (0.532)
PROC8a	ECTOC TRA	3.751 (0.234)	ECTOC TRA	0.137 (0.034)
PROC8b	ECTOC TRA	0.563 (0.035)	ECTOC TRA	0.686 (0.170)
PROC9	ECTOC TRA	1.876 (0.117)	ECTOC TRA	0.686 (0.170)
PROC10	ECTOC TRA	3.751 (0.234)	ECTOC TRA	1.371 (0.340)
PROC13	ECTOC TRA	3.751 (0.234)	ECTOC TRA	0.686 (0.170)
PROC15	ECTOC TRA	1.876 (0.117)	ECTOC TRA	0.034 (0.085)

Environmental exposure

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of oxalic acid in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to H⁺ discharges, being the toxicity of oxalic acid expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale.

The high water solubility and very low vapour pressure indicate that oxalic acid will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario.

Environmental emissions	The production of oxalic acid can potentially result in an aquatic emission and locally increase the oxalic acid concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from oxalic acid production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.						
Exposure concentration in waste water treatment plant (WWTP) (RCR in STP)	ERC1 (RCR)	ERC2 (RCR)	ERC3 (RCR)	ERC4 (RCR)	ERC5 (RCR)	ERC6a (RCR)	ERC6b (RCR)
	0.024	0.001	0.08	0.10	0.10	0.016	0.01
Exposure concentration in aquatic pelagic compartment	When oxalic acid is emitted to surface water, sorption to particulate matter and sediment will be negligible. When oxalic acid is rejected to surface water, the pH may decrease, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be.						
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for oxalic acid: when oxalic acid is emitted to the aquatic compartment, sorption to sediment particles is negligible.						
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.						
Exposure concentration in atmospheric	The air compartment is not included in this CSA because it is considered not relevant for oxalic acid.						

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compartment	
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for oxalic acid: a risk assessment for secondary poisoning is therefore not required.
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
Occupational The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as ECTOC TRA (www.ecetoc.org/tra) to estimate the associated exposure. DNELinhalation for oxalic acid of 2.29 mg/(kg.day). DNELdermal for oxalic acid of 4.03 mg/(kg.day)	
Environmental If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment.	

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9.2. Industrial uses of solid oxalic acid

9.2.1. Exposure scenario

1. Title			
Free short title	Use of solid oxalic acid		
ES numer	2		
Systematic title based on use descriptor	SU3, SU5, SU6a, SU6b SU8, SU9, SU10, SU13, SU14, SU16, SU17, SU18, SU19, SU20, SU23, SU0 PC0, PC7, PC9, PC10, PC14, PC 15, PC19, PC20, PC21, PC23, PC32, PC35, PC36, PC37, PC34 ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.		
Assessment Method	The assessment of inhalation, dermal and environmental exposure and is based on ECETOC TRA.		
2. Operational conditions and risk management measures			
PROC	REACH definition	Involved tasks	
PROC1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN, 26/03/2010).	
PROC2	Use in closed, continuous process with occasional controlled exposure		
PROC3	Use in closed batch process (synthesis or formulation)		
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises		
PROC5	Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant con-tact)		
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		
PROC14	Production of preparations* or articles by tableting, compression, extrusion, pelletisation		
PROC15	Use as laboratory reagent		
PROC21	Low energy manipulation of substances bound in materials and/or articles		
PROC22	Potentially closed processing operations with minerals/metals at elevated temperature		
ERC 1-6b	Manufacture, formulation and all types of industrial uses		
2.1 Control of workers exposure			
Product characteristics			
PROC	Used in preparation?	Content in preparation	Emission potential
All applicable PROCs	Not excluded	(not restricted)	medium
Amounts used			

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The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation, (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.				
Frequency and duration of use/exposure				
All applicable PROCs	> 4 hours (not restricted)			
Technical conditions and measures at process level (source) to prevent release				
Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.				
Technical conditions and measures to control dispersion from source towards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to ECTOC TRA)	Further information
All applicable PROCs	Separation of workers is generally not required in the processes, unless a specific process step is conducted less than full-shift. If that is the case, it has to be guaranteed that the worker is separated from the emission source for the remaining shift.	local exhaust ventilation (LEV) (*The use of LEV is not mandatory for PROC1, PROC2, PROC3, PROC14, PROC15 and PROC21, but it is recommended)	N/A	--
Organisational measures to prevent /limit releases, dispersion and exposure				
Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.				
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	Specification of RPE and efficiency	Specification of gloves	Specification of eye protection	Further PPE
All other applicable PROCs	Not required	Use suitable gloves (Nitrile, Neoprene, Natural rubber, Polyvinyl chloride, natural rubber: Permeation Breakthrough > 360). Protective clothing.	As oxalic acid is irritating to eyes, the use of face shield or eye protection is a prerequisite for all process steps.	standard working clothes
2.2 Control of environmental exposure				
Amounts used				
The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.				
Frequency and duration of use				
Intermittent (< 12 time per year) or continuous use/release				
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil				
Risk management measures related to the environment aim to avoid discharging oxalic acid solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation).				
Conditions and measures related to waste				
Solid industrial waste of oxalic acid should be reused or discharged to the industrial wastewater and further neutralized if needed.				
3. Exposure estimation and reference to its source				

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Occupational exposure							
<p>ECTO TRA was used for the inhalation and dermal exposure assessment. The risk characterisation ratio (RCR) for inhalation exposure is based on the DNEL_{inhalation} for oxalic acid of 2.29 mg.kg⁻¹ day⁻¹. The risk characterisation ratio (RCR) for dermal exposure is based on the DNEL_{dermal} for oxalic acid of 4.03 mg.kg⁻¹ day⁻¹.</p>							
PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate mg/m ³ (RCR)		Method used for dermal exposure assessment	Dermal exposure estimate mg/kg/day (RCR)		
PROC1	ECTO TRA	0.010	(0.001)	ECTO TRA	0.034	(0.009)	
PROC2	ECTO TRA	0.100	(0.006)	ECTO TRA	0.137	(0.034)	
PROC3	ECTO TRA	0.100	(0.006)	ECTO TRA	0.034	(0.009)	
PROC4	ECTO TRA	2.500	(0.156)	ECTO TRA	0.686	(0.170)	
PROC5	ECTO TRA	2.500	(0.156)	ECTO TRA	0.069	(0.017)	
PROC7	ECTO TRA	5.000	(0.312)	ECTO TRA	2.143	(0.532)	
PROC8a	ECTO TRA	5.000	(0.312)	ECTO TRA	0.137	(0.034)	
PROC8b	ECTO TRA	1.250	(0.078)	ECTO TRA	0.686	(0.170)	
PROC9	ECTO TRA	2.000	(0.125)	ECTO TRA	0.686	(0.170)	
PROC10	ECTO TRA	1.000	(0.062)	ECTO TRA	1.371	(0.340)	
PROC13	ECTO TRA	0.500	(0.031)	ECTO TRA	0.686	(0.170)	
PROC 14	ECTO TRA	1.000	(0.062)	ECTO TRA	0.343	(0.085)	
PROC15	ECTO TRA	0.500	(0.031)	ECTO TRA	0.034	(0.009)	
PROC21	ECTO TRA	1.000	(0.062)	ECTO TRA	0.283	(0.070)	
PROC 22	ECTO TRA	0.100	(0.006)	ECTO TRA	0.849	(0.211)	
Environmental exposure							
<p>The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of oxalic acid in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to H⁺ discharges, being the toxicity of oxalic acid expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale.</p> <p>The high water solubility and very low vapour pressure indicate that oxalic acid will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario.</p>							
Environmental emissions	<p>The production of oxalic acid can potentially result in an aquatic emission and locally increase the oxalic acid concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from oxalic acid production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.</p>						
Exposure concentration in waste water treatment plant (WWTP) (RCR in STP)	ERC1 (RCR)	ERC2 (RCR)	ERC3 (RCR)	ERC4 (RCR)	ERC5 (RCR)	ERC6a (RCR)	ERC6b (RCR)
	0.024	0.001	0.0001	0.10	0.10	0.016	0.01
Exposure concentration in aquatic pelagic compartment	<p>When oxalic acid is emitted to surface water, sorption to particulate matter and sediment will be negligible. When oxalic acid is rejected to surface water, the pH may decrease, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be.</p>						

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Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for oxalic acid: when oxalic acid is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for oxalic acid.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for oxalic acid: a risk assessment for secondary poisoning is therefore not required.
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
<p>Occupational</p> <p>The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as ECTOC TRA (www.ecetoc.org/tra) to estimate the associated exposure.</p> <p>DNEL_{inhalation} for oxalic acid of 2.29 mg/(kg.day). DNEL_{dermal} for oxalic acid of 4.03 mg/(kg.day)</p> <p>Environmental</p> <p>If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment.</p>	

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9.3. Professional uses of aqueous solutions of oxalic acid

9.3.1. Exposure scenario

1. Title				
Free short title	Professional use of aqueous solutions of oxalic acid			
ES number	3			
Systematic title based on use descriptor	SU22, SU6a, SU18 PC9a, PC14, PC15, PC25, PC35, PC31 PROC10, PROC11, PROC15, PROC21 ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f			
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.			
Assessment Method	The assessment of inhalation, dermal and environmental exposure and is based on ECETOC TRA.			
2. Operational conditions and risk management measures				
PROC	REACH definition	Involved tasks		
PROC10	Roller application or brushing	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN, 26/03/2010).		
PROC11	Non industrial spraying			
PROC15	Use as laboratory reagent			
PROC21	Low energy manipulation of substances bound in materials and/or articles			
ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems			
2.1 Control of workers exposure				
Product characteristics				
PROC	Used in preparation?	Content in preparation	Emission potential	
PROC10, PROC11	Not excluded	>25% w/w (not restricted)	High	
All other applicable PROCs	Not excluded	>25% w/w (not restricted)	Low	
Amounts used				
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation, (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.				
Frequency and duration of use/exposure				
All applicable PROCs	> 4 hours (not restricted)			
Technical conditions and measures at process level (source) to prevent release				
Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.				
Technical conditions and measures to control dispersion from source towards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to ECTOC TRA)	Further information
All applicable PROCs	Separation of workers is generally not required in the	local exhaust ventilation	N/A	--

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	processes, unless a specific process step is conducted less than full-shift. If that is the case, it has to be guaranteed that the worker is separated from the emission source for the remaining shift.			
Organisational measures to prevent /limit releases, dispersion and exposure				
Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.				
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	Specification of RPE and efficiency	Specification of gloves	Specification of eye protection	Further PPE
PROC10, PROC11	Use of respiratory protection with minimum efficiency of 90%	Use suitable gloves (Nitrile, Neoprene, Natural rubber, Polyvinyl chloride, natural rubber: Permeation Breakthrough > 360). Protective clothing.	As oxalic acid is irritating to eyes, the use of face shield or eye protection is a prerequisite for all process steps.	standard working clothes
All other applicable PROCS	Not required			
2.2 Control of environmental exposure				
Amounts used				
1.000 kg/day				
Frequency and duration of use				
Intermittent (< 12 time per year) or continuous use/release				
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil				
Risk management measures related to the environment aim to avoid discharging oxalic acid solutions into municipal wastewater or to surface water.				
Conditions and measures related to waste				
Oxalic acid wastes must not be disposed together with household garbage. Do not allow product to reach sewage system.				
3. Exposure estimation and reference to its source				
Occupational exposure				
ECTOC TRA was used for the inhalation and dermal exposure assessment. The risk characterisation ratio (RCR) for inhalation exposure is based on the DNELinhalation for oxalic acid of 2.29 mg.kg ⁻¹ day ⁻¹ . The risk characterisation ratio (RCR) for dermal exposure is based on the DNELdermal for oxalic acid of 4.03 mg.kg ⁻¹ day ⁻¹				
PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate mg/m3 (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate mg/kg/day (RCR)

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PROC10	ECTOC TRA	1.876 (0.117)	ECTOC TRA	1.371 (0.340)
PROC11	ECTOC TRA	7.503 (0.468)	ECTOC TRA	2.143 (0.532)
PROC15	ECTOC TRA	3.751 (0.234)	ECTOC TRA	0.034 (0.009)
PROC21	ECTOC TRA	Only for solids	ECTOC TRA	0.283 (0.070)

Environmental exposure

The high water solubility and very low vapour pressure indicate that oxalic acid will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario.

Environmental emissions						
Exposure concentration in local fresh water	ERC8a (RCR)	ERC8b (RCR)	ERC8c (RCR)	ERC8d (RCR)	ERC8e (RCR)	ERC8f (RCR)
	0.179	0.013	0.011	0.179	0.013	0.011
Exposure concentration in aquatic pelagic compartment	When oxalic acid is emitted to surface water, sorption to particulate matter and sediment will be negligible. When oxalic acid is rejected to surface water, the pH may decrease, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be.					
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for oxalic acid: when oxalic acid is emitted to the aquatic compartment, sorption of to sediment particles is negligible.					
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.					
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for oxalic acid.					
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for oxalic acid: a risk assessment for secondary poisoning is therefore not required.					

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

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as ECTOC TRA (www.ecetoc.org/tra) to estimate the associated exposure.

DNELinhalation for oxalic acid of 2.29 mg/(kg.day).

DNELdermal for oxalic acid of 4.03 mg/(kg.day)

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9.4. Professional uses of solid oxalic acid

9.4.1. Exposure scenario

1. Title				
Free short title	Professional use of solid oxalic acid			
ES number	4			
Systematic title based on use descriptor	SU22, SU6a, SU18 PC9a, PC14, PC15, PC25, PC35, PC31 PROC10, PROC11, PROC15, PROC21 ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f			
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.			
Assessment Method	The assessment of inhalation, dermal and environmental exposure and is based on ECETOC TRA.			
2. Operational conditions and risk management measures				
PROC	REACH definition	Involved tasks		
PROC10	Roller application or brushing	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN, 26/03/2010).		
PROC11	Non industrial spraying			
PROC15	Use as laboratory reagent			
PROC21	Low energy manipulation of substances bound in materials and/or articles			
ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems			
2.1 Control of workers exposure				
Product characteristics				
PROC	Used in preparation?	Content in preparation	Emission potential	
All applicable PROCs	Not excluded	>25% w/w (not restricted)	Low	
Amounts used				
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation, (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.				
Frequency and duration of use/exposure				
All applicable PROCs	> 4 hours (not restricted)			
Technical conditions and measures at process level (source) to prevent release				
Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.				
Technical conditions and measures to control dispersion from source towards the worker				
PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to ECTOC TRA)	Further information
All applicable PROCs	Separation of workers is generally not required in the processes, unless a specific process step is conducted	local exhaust ventilation	N/A	--

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	less than full-shift. If that is the case, it has to be guaranteed that the worker is separated from the emission source for the remaining shift.			
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Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

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

PROC	Specification of RPE and efficiency	Specification of gloves	Specification of eye protection	Further PPE
All other applicable PROCS	Not required	Use suitable gloves (Nitrile, Neoprene, Natural rubber, Polyvinyl chloride, natural rubber: Permeation Breakthrough > 360). Protective clothing.	As oxalic acid is irritating to eyes, the use of face shield or eye protection is a prerequisite for all process steps.	standard working clothes

2.2 Control of environmental exposure

Amounts used

1.000 kg/day

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging oxalic acid solutions into municipal wastewater or to surface water.

Conditions and measures related to waste

Oxalic acid wastes must not be disposed together with household garbage. Do not allow product to reach sewage system.

3. Exposure estimation and reference to its source

Occupational exposure

ECTOC TRA was used for the inhalation and dermal exposure assessment. The risk characterisation ratio (RCR) for inhalation exposure is based on the DNEL_{inhalation} for oxalic acid of 2.29 mg.kg⁻¹ day⁻¹. The risk characterisation ratio (RCR) for dermal exposure is based on the DNEL_{dermal} for oxalic acid of 4.03 mg.kg⁻¹ day⁻¹.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate mg/m ³ (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate mg/kg/day (RCR)
PROC10	ECTOC TRA	0.100 (0.006)	ECTOC TRA	1.371 (0.340)
PROC11	ECTOC TRA	0.200 (0.012)	ECTOC TRA	2.143 (0.532)
PROC15	ECTOC TRA	0.020 (0.001)	ECTOC TRA	0.034 (0.009)
PROC21	ECTOC TRA	0.600 (0.037)	ECTOC TRA	0.283 (0.070)

Environmental exposure

The high water solubility and very low vapour pressure indicate that oxalic acid will be found predominantly in water. Significant emissions

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or exposure to air are not expected due to the low vapour pressure. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario.

Environmental emissions						
Exposure concentration in local fresh water	ERC8a (RCR)	ERC8b (RCR)	ERC8c (RCR)	ERC8d (RCR)	ERC8e (RCR)	ERC8f (RCR)
	0.179	0.013	0.011	0.179	0.013	0.011
Exposure concentration in aquatic pelagic compartment	When oxalic acid is emitted to surface water, sorption to particulate matter and sediment will be negligible. When oxalic acid is rejected to surface water, the pH may decrease, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be.					
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for oxalic acid: when oxalic acid is emitted to the aquatic compartment, sorption of to sediment particles is negligible.					
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.					
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for oxalic acid.					
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for oxalic acid: a risk assessment for secondary poisoning is therefore not required.					

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

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as ECTOC TRA (www.ecetoc.org/tra) to estimate the associated exposure.

DNEL_{inhalation} for oxalic acid of 2.29 mg/(kg.day).

DNEL_{dermal} for oxalic acid of 4.03 mg/(kg.day)

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9.5. Consumer uses of oxalic acid

9.5.1. Exposure scenario

1. Title				
Free short title	Consumer uses of preparation containing oxalic acid			
ES number	5			
Systematic title based on use descriptor	SU21 PC9a, PC35, PC31 PROC21 ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f			
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.			
Assessment Method	The assessment of inhalation, dermal and environmental exposure and is based on ECETOC TRA.			
2. Operational conditions and risk management measures				
PROC	REACH definition	Involved tasks		
PROC21	Low energy manipulation of substances bound in materials and/or articles	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN, 26/03/2010).		
ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems			
2.1 Control of exposure				
Product characteristics				
PROC	Used in preparation?	Content in preparation	Emission potential	
All applicable PROCs	Not excluded	>25% w/w (not restricted)	Low	
Amounts used				
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation, (and level of containment/automation (as reflected in the PC) is the main determinant of the use intrinsic emission potential.				
Frequency and duration of use/exposure				
All applicable PROCs	(not restricted)			
Technical conditions and measures at process level (source) to prevent release				
Risk management measures for this consumer use are generally not required in the processes.				
Conditions of use for the consumers				
PC	PC sub-category	Product spray?	Amount of product used per application (g)	Product ingredient fraction by weight
PC35	Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	No	10	<5%
PC9a	Removers (paint-, glue-, wall paper-, sealant-remover)	No	10	<5%
PC31	Polishes and wax blends	No	10	<5%
Organisational measures to prevent /limit releases, dispersion and exposure				
Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These				

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measures involve good personal and housekeeping, no eating and smoking while using the substance. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

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

PROC	Specification of RPE and efficiency	Specification of gloves	Specification of eye protection	Further PPE
All other applicable PROCS	Not required	Not required Avoid contact with skin	Not required Avoid contact with eyes	Not required

2.2 Control of environmental exposure

Amounts used

10 g/application

Frequency and duration of use

Intermittent (< 12 time per year)

3. Exposure estimation and reference to its source

Occupational exposure

ECTOC TRA was used for the inhalation and dermal exposure assessment. The risk characterisation ratio (RCR) for inhalation exposure is based on the DNEL_{dermal} for consumer for oxalic acid of 1.14 mg.kg⁻¹ day⁻¹.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate mg/m ³ (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate mg/kg/day (RCR)
PC39	ECTOC TRA	0.02	ECTOC TRA	0.238 (0.20)
PC9a	ECTOC TRA	0.02	ECTOC TRA	0.238 (0.20)
PC31	ECTOC TRA	0.02	ECTOC TRA	0.238 (0.20)

Environmental exposure

The high water solubility and very low vapour pressure indicate that oxalic acid will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario.

Environmental emissions	
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for oxalic acid: when oxalic acid is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for oxalic acid.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for oxalic acid: a risk assessment for secondary poisoning is therefore not required.