



SAFETY DATA SHEET

CITRIC ACID

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Compilation date: 09/09/11

Revision No: 5

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: CITRIC ACID

REACH registered number(s): 01-2119457026-42-XXXX

CAS number: See Section 16

EINECS number: 201-069-1

Synonyms: 2-HYDROXYPROPANE-1,2,3-TRICARBOXYLIC ACID

FRUIT ACID

THIS SAFETY DATA SHEET COVERS BOTH THE ANHYDROUS & MONOHYDRATE FORMS

INCI name: * Citric acid

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

Use of substance / mixture: pH Adjustment. Descaling. Food Additive.

1.3. Details of the supplier of the safety data sheet

Company name: Monarch Chemicals Limited

New Road

Sheerness

Kent

ME12 1LZ

United Kingdom

Tel: 01795 583333 (09:00 - 17:00 Mon-Fri)

Fax: 01795 583300

Email: sales@monarchchemicals.co.uk

1.4. Emergency telephone number

Emergency tel: 07711 009064 (Out of Hours)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Eye Irrit. 2: H319

Classification under CHIP: Xi: R36/38

Most important adverse effects: Causes serious eye irritation.

2.2. Label elements

Label elements under CLP:

Hazard statements: * H319: Causes serious eye irritation.

Signal words: * Warning

Hazard pictograms: * GHS07: Exclamation mark

[cont...]

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Precautionary statements: * P264: Wash thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+313: If skin irritation occurs: Get medical advice/attention.

2.3. Other hazards

PBT: This substance is not identified as a PBT substance.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical identity: CITRIC ACID

Section 4: First aid measures

4.1. Description of first aid measures

- Skin contact:** Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. If irritation develops or persists seek medical attention.
- Eye contact:** Bathe the eye with running water for 15 minutes. Transfer to hospital for specialist examination.
- Ingestion:** Wash out mouth with water. Do not induce vomiting. If conscious, give half a litre of water to drink immediately. If irritation develops or persists seek medical attention.
- Inhalation:** Remove casualty from exposure ensuring one's own safety whilst doing so. If conscious, ensure the casualty sits or lies down. If unconscious and breathing is OK, place in the recovery position. If unconscious, check for breathing and apply artificial respiration if necessary. If symptoms develop seek medical attention.

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

- Skin contact:** There may be irritation and redness at the site of contact. An itchy rash may occur at the site of contact. Repeated or long exposure can cause reddening, burning and blisters.
- Eye contact:** There may be irritation and redness. The eyes may water profusely. May cause mechanical irritation to the eyes.
- Ingestion:** May cause mild irritation of the gastrointestinal tract if large quantities are ingested. Nausea and stomach pain may occur. There may be vomiting.
- Inhalation:** May cause irritation of the mucous membranes and respiratory system.
- Delayed / immediate effects:** Immediate effects can be expected after short-term exposure.

[cont...]

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

Immediate / special treatment: Eye bathing equipment should be available on the premises.

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Water spray. Alcohol or polymer foam. Dry chemical powder. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Wear suitable protective clothing. Do not attempt to take action without suitable protective clothing - see section 8 of SDS. Do not create dust.

6.2. Environmental precautions

Environmental precautions: Do not discharge into drains or rivers.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Transfer to a closable, labelled salvage container for disposal by an appropriate method. Wash the spillage site with large amounts of water. Product may be dampened with a little water to reduce dust formation.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS. Refer to section 13 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Wear suitable protective clothing. Ensure there is sufficient ventilation of the area. Avoid the formation or spread of dust in the air. Avoid contact with the material and breathing its dust.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Avoid contact with water or humidity. Avoid incompatible materials and conditions - see section 10 of SDS.

Suitable packaging: Paper, plastic or poly-lined bags or kegs.

[cont...]

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7.3. Specific end use(s)

Specific end use(s): * No special requirement.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Workplace exposure limits:

Respirable dust

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
UK	-	-	4 mg/m ³	-

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area. Ensure all engineering measures mentioned in section 7 of SDS are in place.

Respiratory protection: Respiratory protective device with particle filter.

Hand protection: Gloves (acid resistant).

Eye protection: Safety goggles. Face-shield. Ensure eye bath is to hand.

Skin protection: Protective clothing. Boots. Ensure safety shower is to hand.

Environmental: No special requirement.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Crystal or crystalline powder.

Colour: Colourless to white.

Odour: Odourless

Oxidising: Non-oxidising (by EC criteria)

Solubility in water: Highly soluble

Also soluble in: Ethanol. Diethyl ether.

Boiling point/range°C: Decomposes

Melting point/range°C: ~153

Autoflammability°C: ~345

pH: 2.3 (10 g/l @ 20 oC)

9.2. Other information

Other information: Not applicable.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

[cont...]

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10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.
Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Humidity. Moist air. Moisture. Extremes of temperature.

10.5. Incompatible materials

Materials to avoid: Strong oxidising agents. Bases. Acetates. Metal Nitrates. Potassium Tartrate. Sulphides.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

Section 11: Toxicological information

11.1. Information on toxicological effects

Toxicity values:

Route	Species	Test	Value	Units
ORAL	RBT	LD50	11700	mg/kg
ORAL	MUS	LD50	5040	mg/kg

Relevant hazards for substance:

Hazard	Route	Basis
Serious eye damage/irritation	OPT	Based on test data

Symptoms / routes of exposure

Skin contact: There may be irritation and redness at the site of contact. An itchy rash may occur at the site of contact. Repeated or long exposure can cause reddening, burning and blisters.

Eye contact: There may be irritation and redness. The eyes may water profusely. May cause mechanical irritation to the eyes.

Ingestion: May cause mild irritation of the gastrointestinal tract if large quantities are ingested.
Nausea and stomach pain may occur. There may be vomiting.

Inhalation: May cause irritation of the mucous membranes and respiratory system.

Delayed / immediate effects: Immediate effects can be expected after short-term exposure.

Other information: Not applicable.

Section 12: Ecological information

12.1. Toxicity

[cont...]

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Ecotoxicity values:

Species	Test	Value	Units
GOLDFISH	96H LC50	440 - 706	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Soluble in water.

12.5. Results of PBT and vPvB assessment

PBT identification: This substance is not identified as a PBT substance.

12.6. Other adverse effects

Other adverse effects: Negligible ecotoxicity. Do not allow to enter watercourses or soils. Spillage in sewers or waterways must be avoided. Large doses causes high/low pH which may affect effluent and sewage treatment processes. Discharge of large quantities may kill fish and other aquatic life due to increase/decrease in pH.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Transfer to a suitable container and arrange for collection by specialised disposal company.

Recovery operations: * No information available at this time.

Disposal of packaging: Contaminated containers must not be treated as household waste. Where practical, containers and packaging should be recycled by a licenced contractor.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

Transport class: This product does not require a classification for transport.

Section 15: Regulatory information

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

Specific regulations: * No specific applicable legislation.

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has been carried out for the substance or the mixture by the supplier.

[cont...]

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Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 453/2010.

* indicates text in the SDS which has changed since the last revision.

CAS Number differs for the two forms - 77-92-9 (Anhydrous) & 5949-29-1 (Monohydrate).

There are no exposure levels set for the specific product thus the following levels should be adhered to,

Total Inhalable Dust (8 hr TWA): 10 mg/m³ Respirable

Dust (8 hr TWA): 4 mg/m³

Phrases used in s.2 and 3: H319: Causes serious eye irritation.

R36/38: Irritating to eyes and skin.

Legal disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

Annexes I. Exposure scenarios

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1. Intermediate
2. Formulation
3. Personal care products
4. Detergent and cleaning products
5. Paper industry
6. Construction products
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8. Oil industry
9. Paints and coatings
10. Photography products
11. Textile industry
12. Laboratory reagents
13. Water treatment
14. Treatment of metal surfaces
15. Agricultural applications
16. Medical devices

1. Exposure Scenario	
Use of citric acid as an intermediate, Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites 09. Manufacture of fine chemicals
Chemical product category (PC):	19. Intermediate
Process category (PROC):	01. Use in closed process, no likelihood of exposure 02. Use in closed, continuous process with occasional controlled exposure 04. Use in batch and other process (synthesis) where opportunity for exposure arises 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Article Categories [AC]	Not applicable
Environmental release category (ERC):	06a. Industrial use resulting in manufacture of another substance (use of intermediates)
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Not applicable
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify

6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	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.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not known
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCS followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

2. Exposure Scenario	
Use of citric acid formulation into preparations/mixtures –industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	10. Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
	05. Manufacture of textiles, leather, fur
	13. Manufacture of other non-metallic mineral products, e.g. plasters, cement
	20. Health services
Chemical product category (PC):	0. Other
	01 Adhesives, sealants
	03. Air care products
	09a. Coatings and paints, thinners, paint removers
	09b. Fillers, putties, plasters, modelling clay
	12. Fertilizers
	18. Ink and toners
	30. Photo-chemicals.
	31. Polishes and wax blends
	35. Washing and cleaning products (including solvent based products)
	39. Cosmetics, personal care products
Process category (PROC):	01. Use in closed process, no likelihood of exposure
	02. Use in closed, continuous process with occasional controlled exposure
	03. Use in closed batch process (synthesis or formulation)
	04. Use in batch and other process (synthesis) where opportunity for exposure arises
	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	07. Industrial spraying
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
	13. Treatment of articles by dipping and pouring
	14. Production of preparations/mixtures or articles by tableting, compression, extrusion, pelletisation
	15. Use as laboratory reagent
	19. Hand-mixing with intimate contact and only PPE available
Article Categories [AC]	Not applicable
Environmental release category (ERC):	01. Manufacture of substances
	02. Formulation of preparations/mixtures
	03. Formulation in materials
	04. Industrial use of processing aids in processes and products, not becoming part of articles
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance /preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	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.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected

10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

3. Exposure Scenario	
Use of citric acid in personal care products. Industrial, professional and consumer users.	
Use is treated as exempt from REACH in respect of human health, formulation is also covered under Citric acid -formulation	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	20. Health services
	21. Consumer uses: Private households (= general public = consumers)
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	02. Adsorbents
	03. Air care products
Process category (PROC):	10. Roller application or brushing
	11. Non industrial spraying
	19. Hand-mixing with intimate contact and only PPE available
Article Categories [AC]	08. Paper articles
Environmental release category (ERC):	08a. Wide dispersive indoor use of processing aids in open systems
	11a. Wide dispersive indoor use of long-life articles and materials with low release
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial & professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Not known
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.
7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application. Use of PPE will to minimise handling and contact

Consumers:	Long term exposure to low concentrations during application/use.
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

4. Exposure Scenario	
Use of citric acid in detergents and cleaning products. Industrial, professional and consumer users	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites 21 Consumer uses: Private households (= general public = consumers)
	22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	03. Air care products 28. Perfumes, fragrances 31. Polishes and wax blends 35. Washing and cleaning products (including solvent based products) 36. Water softeners 37. Water treatment chemicals
Process category (PROC):	01. Use in closed process, no likelihood of exposure 02. Use in closed, continuous process with occasional controlled exposure 04 Use in batch and other process (synthesis) where opportunity for exposure arises 05. Mixing or blending in batch processes for formulation of preparations/mixtures/mixtures and articles (multistage and/or significant contact) 07. Industrial spraying 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities 09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) 10. Roller application or brushing 11. Non industrial spraying 13. Treatment of articles by dipping and pouring 19. Hand-mixing with intimate contact and only PPE available
Article Categories [AC]	08. Paper articles
Environmental release category (ERC):	02. Formulation of preparations/mixtures 04. Industrial use of processing aids in processes and products, not becoming part of articles 08a. Wide dispersive indoor use of processing aids in open systems 8d. Wide dispersive outdoor use of processing aids in open systems 09a. Wide dispersive indoor use of substances in closed systems 09b. Wide dispersive outdoor use of substances in closed systems
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify

Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Formulators information
Service life of substances in articles:	In use 2 to 12 months
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.
7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Long term exposure to low concentrations during application/use
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

5. Exposure Scenario	
Use of citric acid in paper industry. Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures in dustrial sites
	06a. Manufacture of pulp, paper and paper products
Chemical product category (PC):	26. Paper and board dye, finishing and impregnation products: including bleaches and other processing aids
Process category (PROC):	05. Mixing or blending in batch processes for formulation of preparations/mixtures/mixtures and articles (multistage and/or significant contact)
	8a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Article Categories [AC]	Not applicable

Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Not known
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

6. Exposure Scenario	
Use of citric acid in construction products. Industrial, professional and consumer	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	02. Mining, (without offshore industries)
	03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites
	10. Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
	19. Building and construction work
	21. Consumer uses: Private households (= general public = consumers)
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	0. Other
Process category (PROC):	02. Use in closed, continuous process with occasional controlled exposure

	04. Use in batch and other process (synthesis) where opportunity for exposure arises
	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	07. Industrial spraying
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	10. Roller application or brushing
	11. Non industrial spraying
	13. Treatment of articles by dipping and pouring
	14. Production of preparations/mixtures or articles by tableting, compression, extrusion, pelletisation
	19. Hand-mixing with intimate contact and only PPE available
	21. Low energy manipulation of substances bound in materials and/or articles
	24. High (mechanical) energy work-up of substances bound in materials and/or articles
Article Categories [AC]	04. Stone, plaster, cement, glass and ceramic articles
Environmental release category (ERC):	05. Industrial use resulting in inclusion into or onto a matrix
	08c. Wide dispersive indoor use resulting in inclusion into or onto a matrix
	08f. Wide dispersive outdoor use resulting in inclusion into or onto a matrix
	10a. Wide dispersive outdoor use of long-life articles and materials with low release
	10b. Wide dispersive outdoor use of long-life articles and materials with high or in-tended release (including abrasive processing)
	11a. Wide dispersive indoor use of long-life articles and materials with low release
	11b. Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)
	12a. Industrial processing of articles with abrasive techniques (low release)
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial/professional, ensure eyewash and showers are in the proximity to workstation location.
Other information:	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.

7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application.
Consumers:	Long term exposure to low concentrations during application/use.
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

7. Exposure Scenario	
Use of citric acid Polymers and plastics. Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
Chemical product category (PC):	32. Polymer preparations and compounds
Process category (PROC):	03. Use in closed batch process (synthesis or formulation)
	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Article Categories [AC]	Not applicable
Environmental release category (ERC):	06b. Industrial use of reactive processing aids
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.

Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	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.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

8. Exposure Scenario	
Use of citric acid in oil industry. Industrial.	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	02. Offshore industries
	03. Industrial uses: Uses of substances as such or in preparations/mixtures in industrial sites
Chemical product category (PC):	20. Products such as pH-regulators, flocculants, precipitants, neutralization agents
	40. Other
Process category (PROC):	03. Use in closed batch process (synthesis or formulation)
	04. Use in batch and other process (synthesis) where opportunity for exposure arises
	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Article Categories [AC]	Not applicable
Environmental release category (ERC):	8d. Wide dispersive outdoor use of processing aids in open systems
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial/professional, ensure eyewash and showers are

	in the proximity to workstation location.
Other information:	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

9. Exposure Scenario	
Use of citric acid in paints and coatings. Industrial, professional and consumer users	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
	18. Manufacture of furniture
	19. Building and construction work
	21. Consumer uses: Private households (= general public = consumers)
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	09a. Coatings and paints, thinners, paint removers
	9b. Fillers, putties, plasters, modelling clay
	18. Ink and toners
	34. Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Process category (PROC):	07. Industrial spraying
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	10. Roller application or brushing
	11. Non industrial spraying

	19. Hand-mixing with intimate contact and only PPE available
	24. High (mechanical) energy work-up of substances bound in materials and/or articles
Article Categories [AC]	04. Stone, plaster, cement, glass and ceramic articles
	11. Wood articles
Environmental release category (ERC):	05. Industrial use resulting in inclusion into or onto a matrix
	08c. Wide dispersive indoor use resulting in inclusion into or onto a matrix
	08f. Wide dispersive outdoor use resulting in inclusion into or onto a matrix
	10a. Wide dispersive outdoor use of long-life articles and materials with low release
	10b. Wide dispersive outdoor use of long-life articles and materials with high or in-tended release (including abrasive processing)
	11a. Wide dispersive indoor use of long-life articles and materials with low release
	11b. Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Not known
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Formulators information
Service life of substances in articles:	
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	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.
7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Exposure to low concentrations during application/use
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

10. Exposure Scenario	
Use of citric acid in photography products. Professional and consumer users	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	20. Health services
	21. Consumer uses: Private households (= general public = consumers)
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	30. Photo-chemicals
Process category (PROC):	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	13. Treatment of articles by dipping and pouring
Article Categories [AC]	Not applicable
Environmental release category (ERC):	08a Wide dispersive indoor use of processing aids in open systems
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Not known
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Formulators information
Service life of substances in articles:	
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Short term during formulation. Long term exposure during application
Consumers:	Exposure to low concentrations during application/use
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	

Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

11. Exposure Scenario	
Use of citric acid in textiles. Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites 05. Manufacture of textiles, leather, fur
Chemical product category (PC):	20. Products such as ph-regulators, flocculants, precipitants, neutralization agents 23. Leather tanning, dye, finishing, impregnation and care products 24. Lubricants, greases, release products
Process category (PROC):	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities 10. Roller application or brushing 13. Treatment of articles by dipping and pouring 22. Potentially closed processing operations with minerals/metals at elevated temperature
Article Categories [AC]	05. Fabrics, textiles and apparel 06. Leather articles
Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Not applicable
8. Waste management measures	

Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

12. Exposure Scenario	
Use of citric acid in laboratory agents. Industrial users	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
Chemical product category (PC):	04. Anti-Freeze and de-icing products 16. Heat transfer fluids 20. Products such as ph-regulators, flocculants, precipitants, neutralization agents 37. Water treatment chemicals
Process category (PROC):	01. Use in closed process, no likelihood of exposure 02. Use in closed, continuous process with occasional controlled exposure 03. Use in closed batch process (synthesis or formulation) 04. Use in batch and other process (synthesis) where opportunity for exposure arises 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Article Categories [AC]	Not applicable
Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles 07. Industrial use of sub-stances in closed systems
3. Operational conditions of use	
Control parameters	Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills.
Engineering control measures:	Keep area well ventilated. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	

Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Formulators information
Service life of substances in articles:	
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

13. Exposure Scenario	
Use of citric acid in water treatment. Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	14. Manufacture of basic metals, including alloys
	15. Manufacture of fabricated metal products, except machinery and equipment
	16. Manufacture of computer, electronic and optical products, electrical equipment
	17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Chemical product category (PC):	04. Anti-Freeze and de-icing products
	07. Base metals and alloys
	14. Metal surface treatment products, including galvanic and electroplating products
	16. Heat transfer fluids
	17. Hydraulic fluids
	20. Products such as pH-regulators, flocculants, precipitants, neutralization agents
	25. Metal working fluids
	26. Paper and board dye, finishing and impregnation products: including bleaches and other processing aids
	35. Washing and cleaning products (including solvent based products)
	37. Water treatment chemicals

Process category (PROC):	01. Use in closed process, no likelihood of exposure
	02. Use in closed, continuous process with occasional controlled exposure
	03. Use in closed batch process (synthesis or formulation)
	04. Use in batch and other process (synthesis) where opportunity for exposure arises
	07. Industrial spraying
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
	10. Roller application or brushing
	13. Treatment of articles by dipping and pouring
	18. Greasing at high energy conditions
	20. Heat and pressure transfer fluids in dispersive, professional use but closed systems
	25. Other hot work operations with metals
Article Categories [AC]	Not applicable
Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles
	07. Industrial use of sub-stances in closed systems
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation

9. Exposure assessment	
Human exposure prediction:	
Workers:	Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMS in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

14. Exposure Scenario	
Use of citric acid in treatment of metals & surfaces. Industrial	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	14. Manufacture of basic metals, including alloys
	15. Manufacture of fabricated metal products, except machinery and equipment
	16. Manufacture of computer, electronic and optical products, electrical equipment
	17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Chemical product category (PC):	07. Base metals and alloys
	14. Metal surface treatment products, including galvanic and electroplating products
	25. Metal working fluids
	31. Polishes and wax blends
	35. Washing and cleaning products (including solvent based products)
Process category (PROC):	02. Use in closed, continuous process with occasional controlled exposure
	03. Use in closed batch process (synthesis or formulation)
	04. Use in batch and other process (synthesis) where opportunity for exposure arises
	07. Industrial spraying
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
	10. Roller application or brushing
	13. Treatment of articles by dipping and pouring
	17. Lubrication at high energy conditions and in partly open process
	18. Greasing at high energy conditions
	23. Open processing and transfer operations with minerals/metals at elevated temperature
Article Categories [AC]	Not applicable
Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles
	06b. Industrial use of reactive processing aids

3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene.
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Not applicable
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Short term exposure during application. Use of PPE will to minimise handling and contact.
Consumers:	Not applicable
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the environment:	Not expected
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

15. Exposure Scenario	
Use of citric acid agricultural applications. Industrial, professional & consumer	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	01. Agriculture, forestry, fishery

	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	21. Consumer uses: Private households (= general public = consumers)
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	09. Biocidal products (e.g. Disinfectants, pest control)
	12. Fertilizers
	21. Laboratory chemicals
Process category (PROC):	03. Use in closed batch process (synthesis or formulation)
	05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact)
	08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
	10. Roller application or brushing
	11. Non industrial spraying
	14. Production of preparations/mixtures or articles by tableting, compression, extrusion, pelletisation
	15. Use as laboratory reagent
	19. Hand-mixing with intimate contact and only PPE available
Article Categories [AC]	02. Formulation of preparations/mixtures
Environmental release category (ERC):	04. Industrial use of processing aids in processes and products, not becoming part of articles
	8b. Wide dispersive indoor use of reactive substances in open systems
	8d. Wide dispersive outdoor use of processing aids in open systems
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.

16. Exposure Scenario	
Use of citric acid in medical devices. Industrial & consumer	
2. Processes and activities covered by the exposure scenario	
Sector of end use (SU):	03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites
	20. Health services
	22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC):	20 Products such as ph-regulators, flocculants, precipitants, neutralization agents
Process category (PROC):	01. Use in closed process, no likelihood of exposure
Article Categories [AC]	07. Industrial use of sub-stances in closed systems
Environmental release category (ERC):	8d. Wide dispersive outdoor use of processing aids in open systems
3. Operational conditions of use	
Control parameters	Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene.
Duration and frequency of use:	Users to specify
Maximum amount per time or activity:	Users to specify
Other operational conditions of use:	Avoid splashes and spills. Minimise manual handling.
Engineering control measures:	Local exhaust ventilation. Exposure limit values: Not known
Other protective equipment:	Good hygiene and housekeeping
Respiratory protection	Required where ventilation is insufficient or exposure is prolonged
Hand protection:	Rubber or PVC gloves
Eye protection:	Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location.
Other information:	Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place.
4. Physical form of substance / preparation / mixture or article	
Information on basic physical and chemical properties:	Acid liquid
5. Product specification	
Physical form of the product:	Part of a preparation can be a liquid or solid.
Concentration of substance in preparation / mixture or article:	Users to specify
Service life of substances in articles:	Users to specify
6. Risk Management Measures	
Occupational exposure controls:	Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation.
Environmental Exposure Controls:	Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate.
7. Consumer use:	Good hygiene and housekeeping
8. Waste management measures	
Description and information on safe handling of surplus or waste:	Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation.
9. Exposure assessment	
Human exposure prediction:	
Workers:	Use of PPE will to minimise handling and contact.
Consumers:	Good hygiene and housekeeping
Method:	Not applicable
Exposure estimation:	Not known
Secondary Poisoning:	Not expected
Indirect exposure to humans via the	Not expected

environment:	
10. Other information	
Control parameters:	Refer to the eSDS
Method to check compliance:	Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals

Annex II Use descriptors

Identified use	Sector of Use - main user groups (SU)	Sector of Use – sectors of end-use	Preparation Category (PC)	Process category (PROC)	Article category (AC)	Environmental Release Category (ERC)
Manufacture	SU3	SU3	PC19	PROC1, 2, 3, 8b		ERC1
Intermediate	SU3	SU3, 9	PC19	PROC1, 2, 3, 4, 8b		ERC6a
Formulation	SU3, 10	SU5, 13, 20	PC0, 1, 3, 9, 12, 18, 30, 31, 35, 39	PROC 2, 3, 4, 5, 7, 8a, 8b, 9, 13, 14, 15, 19		ERC1, 2, 3, 4
Personal care products	SU21, 22	SU20	PC2, 39	PROC 10, 11, 19	AC8	ERC 8a, 11a
Detergent and cleaning products	SU3, 21, 22		PC3, 28, 31, 35, 36, 37	PROC1, 2, 4, 5, 7, 8a, 8b, 9, 10, 11, 13, 19	AC8 AC35	ERC2, 4, 8A, 8D, 9A, 9B
Paper industry	SU3	SU6	PC26	PROC 5, 8a		ERC4
Construction products	SU3, 21, 22	SU2, 10, 19	PC10	PROC 2, 4, 5, 7, 8a, 8b, 10, 11, 13, 14, 19, 21, 24	AC4, 12-1, 12-2	ERC5, 8c, 8f, 10a, 10b, 11a, 11b, 12a
Polymers and plastics	SU3	SU11, 12	PC32	PROC 3, 5, 8a, 8b		RC6b
Oil industry	SU3	SU2	PC20, 40	PROC 3, 4, 5, 8a, 8b,		ERC8d
Paints and coatings	SU3, 21, 22	SU17, 18, 19	PC9, 18, 34	PROC 7, 8a, 8b, 10, 11, 19, 21, 24	AC4, 11	ERC5, 8c, 8f, 10a, 10b, 11a, 11b
Photography products	SU3, 21, 22	SU20	PC30	PROC 5, 13		ERC8a
Textile industry	SU3	SU5	PC20, 23, 24	PROC 8a, 8b, 10, 13, 22	AC5, 6	ERC4
Laboratory reagents	SU3		PC4, 16, 20, 37	PROC 1, 2, 3, 4, 8a,		ERC4, 7
Water treatment	SU3	SU14, 15, 16, 17	PC4, 7, 14, 16, 17, 20, 25, 31, 35, 37	PROC 1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 18, 20, 25, xyz1		ERC4, 7
Treatment of metal surfaces SU3	SU3	SU14, 15, 16, 17	PC7, 14, 25, 31, 35	PROC 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18, 23		ERC4, 6b
Agricultural applications	SU3, 21, 22	SU1	PC8, 12, 21	PROC 3, 5, 8a, 8b, 10, 11, 14, 15, 19		ERC2, 4, 8b, 8d
Medical devices	SU3	SU22 SU20	PC20	PROC1		ERC7