

This safety data sheet was created pursuant to the requirements of:
UK REACH Regulations (SI 2019/758 as amended)

Supersedes date 27-Jun-2024

Revision date 20-May-2025

Revision Number 3

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

1.1. Product identifier

Product Code(s) 12553

Safety data sheet number 12553

Product Name ALUMINIUM SULPHATE SOLUTION

Synonyms ALUMINIUM SULPHATE SOLUTION 8% AL₂O₃, ALUM SULPHATE 8% SOL, ALUM SULPHATE 8% SOL UKI, ALUM SULPHATE SOL ZW, ALUM SULPHATE 8% FR, ALUMINIUM SULPHATE 8% FRO

Pure substance/mixture Mixture

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

Recommended use Water treatment chemical
Thickening agent
Intermediate
Use in laboratories
Paper production
Textiles
Construction materials
Agriculture
For further information, see attached Exposure Scenario

1.3. Details of the supplier of the safety data sheet

Supplier

Univar Solutions UK Ltd
Aquarius House
6 Mid Point Business Park
Bradford
GBR

For further information, please contact

E-mail address SDS.EMEA@univarsolutions.com

Non-Emergency Telephone Number +44 1274 267300 / +44 1274 267306

1.4. Emergency telephone number

Emergency Telephone SGS - +32 (0)3 575 55 55 (24h)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Corrosive to metals	Category 1 - (H290)
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Serious eye damage/eye irritation

Category 1 - (H318)

2.2. Label elements**Signal word**

Danger

Hazard statements

H318 - Causes serious eye damage

H290 - May be corrosive to metals

Precautionary statements

P260 - Do not breathe dust/fume/gas/mist/vapours/spray

P280 - Wear protective gloves/protective clothing and eye/face protection

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P310 - Immediately call a POISON CENTER or doctor

P406 - Store in corrosion resistant container with a resistant inner liner

Unknown aquatic toxicity

Contains 0 % of components with unknown hazards to the aquatic environment.

Additional information

This product requires child resistant fastenings if supplied to the general public. This product requires tactile warnings if supplied to the general public.

2.3. Other hazards

No information available.

SECTION 3: Composition/information on ingredients**3.1 Substances**

Not applicable

3.2 Mixtures

The product contains no substances which at their given concentration, are considered to be hazardous to health

Chemical name	Weight-%	EC No (EU Index No)	UK REACH registration number	Classification according to GB CLP (SI 2020/1567 as amended)	Specific concentration limit (SCL)	M-Factor	M-Factor (long-term)
ALUMINIUM SULPHATE 10043-01-3	25 - 30%	233-135-0	-	Met. Corr. 1 (H290) Eye Dam. 1 (H318)	-	-	-

Full text of H- and EUH-phrases: see section 16

This product does not contain candidate substances of very high concern at a concentration $\geq 0.1\%$ (UK REACH Article 59)

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.
Inhalation	Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Get immediate medical attention.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical attention.
Skin contact	IF ON SKIN: Wash with plenty of water and soap. Get medical attention if symptoms occur.
Ingestion	Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.
Self-protection of the first aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Wear personal protective clothing (see section 8).

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

Inhalation	In high concentrations, vapours may irritate throat and respiratory system and cause coughing.
Eyes	Causes serious eye damage. May cause irreversible damage to eyes.
Dermal	Prolonged contact may cause dryness of the skin.
Ingestion	Irritating. May cause nausea, stomach pain and vomiting.

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

Note to doctors	Treat symptomatically.
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SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Large Fire	CAUTION: Use of water spray when fighting fire may be inefficient.
Unsuitable extinguishing media	Do not scatter spilled material with high pressure water streams.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical	Thermal decomposition can lead to release of irritating and toxic gases and vapours. May be corrosive to metals.
Hazardous combustion products	Oxides of sulphur.

5.3. Advice for firefighters

Special protective equipment and precautions for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Collect contaminated fire extinguishing water separately. Do not allow it to enter drains or surface water.
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SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions	Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid contact with skin, eyes and inhalation of vapours. Use personal protection recommended in Section 8.
Other information	Refer to protective measures listed in Sections 7 and 8.
For emergency responders	Use personal protection recommended in Section 8.

6.2. Environmental precautions

Environmental precautions	Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.
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6.3. Methods and material for containment and cleaning up

Methods for containment	Prevent further leakage or spillage if safe to do so.
Methods for cleaning up	Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. After cleaning, flush away traces with water.
Prevention of secondary hazards	Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Reference to other sections	See section 8 for more information. See section 13 for more information.
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SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Advice on safe handling	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash it before reuse. Avoid contact with skin, eyes and inhalation of vapours.
General hygiene considerations	Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Remove contaminated clothing and protective equipment before entering eating areas. Ensure that eyewash stations and safety showers are close to the workstation location.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from food, drink and animal feedingstuffs. Store in corrosive resistant container with a resistant inner liner. Protect from frost. Avoid contact with: Bases. alkali. Metals. Strong oxidising agents. Strong reducing agents.
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7.3. Specific end use(s)

Specific use(s)	See section 1 for more information.
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Risk Management Methods (RMM)	The information required is contained in this Safety Data Sheet.
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SECTION 8: Exposure controls/personal protection**8.1. Control parameters**

Exposure Limits Aluminium salts, soluble TWA 2 mg/m³.

Biological occupational exposure limits This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Derived No Effect Level (DNEL) - Workers

Chemical name	Oral	Dermal	Inhalation
ALUMINIUM SULPHATE 10043-01-3		3.8 mg/kg/day [4] [6]	13.4 mg/m ³ [4] [6]

[4] Systemic health effects.
[6] Long term.

Derived No Effect Level (DNEL) - General Public

Chemical name	Oral	Dermal	Inhalation
ALUMINIUM SULPHATE 10043-01-3	1.9 mg/kg/day [4] [6]	1.9 mg/kg/day [4] [6]	3.3 mg/m ³ [4] [6]

Predicted No Effect Concentration (PNEC)

Chemical name	Freshwater	Freshwater (intermittent release)	Marine water	Marine water (intermittent release)	Air
ALUMINIUM SULPHATE 10043-01-3	0.3 µg/l		0.03 µg/l		

Chemical name	Freshwater sediment	Marine sediment	Sewage treatment	Soil	Food chain
ALUMINIUM SULPHATE 10043-01-3					20 mg/l

8.2. Exposure controls

Engineering controls Ensure adequate ventilation. Local and General Ventilation. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eye/face protection Tight sealing safety goggles. Face protection shield. Use eye protection according to EN 166.

Hand protection Wear suitable gloves. Impervious gloves. Gloves must conform to standard EN 374. Ensure that the breakthrough time of the glove material is not exceeded. Refer to glove supplier for information on breakthrough time for specific gloves. Examples of preferred glove barrier materials include: Polyvinyl chloride (PVC). Neoprene gloves.

Skin and body protection Wear suitable protective clothing.

Respiratory protection In case of inadequate ventilation wear respiratory protection. Inorganic gases and vapours filter conforming to EN 14387.

General hygiene considerations	Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Remove contaminated clothing and protective equipment before entering eating areas. Ensure that eyewash stations and safety showers are close to the workstation location.
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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Colourless liquid
Colour	clear
Odour	No information available.
Odour threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Melting point / freezing point	< -12 °C	No information available.
Initial boiling point and boiling range	> 100 °C	No information available.
Flammability		No information available.
Flammability Limit in Air		No information available.
Upper flammability or explosive limits		
Lower flammability or explosive limits		
Flash point		No information available.
Autoignition temperature		No information available.
Decomposition temperature		No information available.
pH	1.8	No information available.
pH (as aqueous solution)		No information available.
Kinematic viscosity		No information available.
Dynamic viscosity	18.6 cP @ 20°C	No information available.
Water solubility	Soluble in water	No information available.
Solubility(ies)		No information available.
Partition coefficient		No information available.
Vapour pressure		No information available.
Relative density	1.30 - 1.35	20 °C.
Bulk density		No information available
Liquid Density	No information available	No information available
Relative vapour density		No information available.
Particle characteristics		No information available.
Particle Size	No information available	
Particle Size Distribution	No information available	
Explosive properties	Not considered to be explosive.	
Oxidising properties	Does not meet the criteria for classification as oxidising	

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	May be corrosive to metals. The following materials may react with the product: Alkali. Bases. Strong oxidising agents. Strong reducing agents.
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10.2. Chemical stability

Stability	Stable under normal conditions.
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Explosion data	
Sensitivity to mechanical impact	None.

Sensitivity to static discharge None.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions None under normal processing.

10.4. Conditions to avoid

Conditions to avoid Protect from frost.

10.5. Incompatible materials

Incompatible materials Acids. Bases. Strong oxidising agents. Strong reducing agents. Metals.

10.6. Hazardous decomposition products

Hazardous decomposition products None under normal use conditions. Thermal decomposition can lead to release of toxic/corrosive gases and vapours. Oxides of sulphur.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure

Product Information

Inhalation	In high concentrations, vapours may irritate throat and respiratory system and cause coughing.
Eye contact	Causes serious eye damage. May cause irreversible damage to eyes.
Skin contact	Prolonged contact may cause dryness of the skin.
Ingestion	Specific test data for the substance or mixture is not available. Causes burns. (based on components). Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Causes serious eye damage. May cause irreversible damage to eyes.

Acute toxicity

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
ALUMINIUM SULPHATE	2000 - 5000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 5 mg/l (Rat)

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation Based on available data the classification criteria are not met.

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Exposure route	Effective dose	Exposure time	Results
OECD 404	Rabbit	Dermal			non-irritant

Serious eye damage/eye irritation Causes serious eye damage. Causes burns.

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Exposure route	Effective dose	Exposure time	Results
OECD 405	Rabbit	eye			Causes serious eye damage

Respiratory or skin sensitisation Based on available data, the classification criteria are not met.

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Exposure route	Results
OECD 406	Guinea pig	Dermal	Not a skin sensitiser

Germ cell mutagenicity Based on available data the classification criteria are not met.

Component Information

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Results
OECD 471	in vitro	Negative
OECD 476	in vitro	Negative
OECD 487	in vitro	Negative

Carcinogenicity Based on available data the classification criteria are not met.

Component Information

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Results
	in vivo	Not Carcinogenic

Reproductive toxicity Based on available data the classification criteria are not met.

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Results
OECD 426	Rat	Negative

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration hazard Based on available data the classification criteria are not met.

Other adverse effects No information available.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicity

The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. Substantial amounts of the product may lead to a local change in acidity in small water systems which may have adverse effects on aquatic organisms.

Aluminium salts must not be released to rivers and lakes in an uncontrolled way and pH variations around 5 - 5.5 should be avoided.

Unknown aquatic toxicity

Contains 0 % of components with unknown hazards to the aquatic environment.

ALUMINIUM SULPHATE (10043-01-3)

Method	Species	Endpoint type	Effective dose	Exposure time	Results
OECD Test No. 202: Daphnia sp., Acute Immobilisation Test	Daphnia magna	EC50	> 200 mg/L	48 hours	
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	ErC50	14 mg/L	72 hours	
EPA/600/4-89/001	Ceriodaphnia dubia	NOEC	3.8 mg/L	8 days	
OECD Test No. 209: Activated Sludge, Respiration Inhibition Test (Carbon and Ammonium Oxidation)	activated sludge	EC50	> 1000 mg/L	180 minutes	

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
ALUMINIUM SULPHATE	-	LC50: > 87.5 mg/L (96h, Danio rerio)	-	-

12.2. Persistence and degradability**Persistence and degradability**

The methods for determining biodegradability are not applicable to inorganic substances.

ALUMINIUM SULPHATE (10043-01-3)

Method	Exposure time	Value	Results
			The methods for determining biodegradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential**Bioaccumulation**

Not likely to bioaccumulate.

12.4. Mobility in soil**Mobility in soil**

No information available.

Mobility

Soluble in water.

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

The product does not contain any substance(s) classified as PBT or vPvB.

Chemical name	PBT and vPvB assessment
ALUMINIUM SULPHATE	Not applicable The substance is not PBT / vPvB

12.6. Other adverse effects

No information available.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Waste from residues/unused products	Waste is classified as hazardous waste. Disposal to licensed waste disposal site in accordance with the local Waste Disposal Authority. Avoid release to the environment.
Contaminated packaging	Do not reuse empty containers.

SECTION 14: Transport information

IATA

14.1 UN number or ID number	UN3264
14.2 UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINIUM SULPHATE)
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	
Special Provisions	A3, A803
ERG Code	8L

IMDG

14.1 UN number or ID number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINIUM SULPHATE)
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	
Special Provisions	223, 274
EmS-No	F-A, S-B
14.7 Maritime transport in bulk according to IMO instruments	No information available

RID

14.1 UN number or ID number	UN3264
14.2 UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINIUM SULPHATE)
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	
Special Provisions	274
Classification code	C1

ADR

14.1 UN number or ID number	UN3264
14.2 UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINIUM SULPHATE)
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	
Special Provisions	274
Classification code	C1
Tunnel restriction code	(E)

SECTION 15: Regulatory information

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

National regulations

Authorisations and/or restrictions on use:

This product contains one or more substances subject to restriction (UK REACH - Annex XVII).

This product does not contain substances subject to authorisation (UK REACH - Annex XIV).

Product restricted per REACH Annex XVII: 3

Persistent Organic Pollutants

Not applicable

Export Notification requirements

Not applicable

Named dangerous substances per COMAH Regulations 2015 (as amended)

Not applicable

The Ozone-Depleting Substances Regulations 2015

Not applicable

The Biocidal Products Regulations 2001 (as amended)

Not applicable

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended)

Not applicable

Poisons Act 1972 (Explosive Precursors) Regulations (as Amended)

Not applicable

International Inventories

TSCA	Contact supplier for inventory compliance status
DSL/NDL	Contact supplier for inventory compliance status
EINECS/ELINCS	Contact supplier for inventory compliance status
ENCS	Contact supplier for inventory compliance status
IECSC	Contact supplier for inventory compliance status
KECI	Contact supplier for inventory compliance status
PICCS	Contact supplier for inventory compliance status
AIIC	Contact supplier for inventory compliance status
NZIoC	Contact supplier for inventory compliance status

Legend:

TSCA	- United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDL	- Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS	- European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS	- Japan Existing and New Chemical Substances
IECSC	- China Inventory of Existing Chemical Substances
KECL	- Korean Existing and Evaluated Chemical Substances
PICCS	- Philippines Inventory of Chemicals and Chemical Substances
AIIC	- Australian Inventory of Industrial Chemicals
NZIoC	- New Zealand Inventory of Chemicals

15.2. Chemical safety assessment

Chemical Safety Report Not applicable

SECTION 16: Other information

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

Full text of H-Statements referred to under section 3

H318 - Causes serious eye damage

Legend

SVHC: Substances of Very High Concern for Authorisation:

Legend Section 8: Exposure controls/personal protection

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation
+	Sensitisers		

Revision Note **SDS sections updated 4 16**

Classification procedure

Classification according to Regulation (EC) No. 1272/2008 [CLP]	Method Used
Acute oral toxicity	Calculation method
Acute dermal toxicity	Calculation method
Acute inhalation toxicity - gas	Calculation method
Acute inhalation toxicity - vapour	Calculation method
Acute inhalation toxicity - dust/mist	Calculation method
Skin corrosion/irritation	Calculation method
Serious eye damage/eye irritation	Calculation method
Respiratory sensitisation	Calculation method
Skin sensitisation	Calculation method
Mutagenicity	Calculation method
Carcinogenicity	Calculation method
Reproductive toxicity	Calculation method
STOT - single exposure	Calculation method
STOT - repeated exposure	Calculation method
Acute aquatic toxicity	Calculation method
Chronic aquatic toxicity	Calculation method
Aspiration hazard	Calculation method
Ozone	Calculation method

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
 U.S. Environmental Protection Agency ChemView Database
 European Food Safety Authority (EFSA)
 European Chemicals Agency (ECHA) Committee for Risk Assessment (ECHA_RAC)
 European Chemicals Agency (ECHA) (ECHA_API)
 Environmental Protection Agency
 Acute Exposure Guideline Level(s) (AEGL(s))
 U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
 U.S. Environmental Protection Agency High Production Volume Chemicals
 Food Research Journal
 Hazardous Substance Database
 International Uniform Chemical Information Database (IUCLID)
 National Institute of Technology and Evaluation (NITE)
 Australian National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
 NIOSH (National Institute for Occupational Safety and Health)
 National Library of Medicine's ChemID Plus (NLM CIP)
 National Library of Medicine's PubMed database (NLM PUBMED)
 U.S. National Toxicology Program (NTP)
 New Zealand's Chemical Classification and Information Database (CCID)
 Organisation for Economic Co-operation and Development Environment, Health, and Safety Publications
 Organisation for Economic Co-operation and Development High Production Volume Chemicals Programme
 Organisation for Economic Co-operation and Development Screening Information Data Set
 World Health Organization

Prepared By J Spenceley

Supersedes date 27-Jun-2024

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**This material safety data sheet complies with the requirements of UK REACH Regulations (SI 2019/758 as amended)
 Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work**

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name AQUALUN
Chemical name Aluminium sulphate
Pure substance/mixture Mixture
REACH registration number 01-2119531538-36-XXXX
CAS No 10043-01-3
EC No (EU Index No) 233-135-0
Supplier Univar Solutions UK Ltd
 Aquarius House
 6 Mid Point Business Park
 Bradford
 GBR

Non-Emergency Telephone Number +44 1274 267300 / +44 1274 267306

E-mail address SDS.EMEA@univarsolutions.com

Section 1 - Title

Title Formulation and Distribution of substance
Type Worker
Main user group Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category(ies) ERC2 - Formulation of preparations (mixtures)
Process category(ies) PROC1 - Use in closed process, no likelihood of exposure
 PROC2 - Use in closed, continuous process with occasional controlled exposure
 PROC3 - Use in closed batch process (synthesis or formulation)
 PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
 PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
 PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
 PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
 PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
 PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising
 PROC15 - Use as laboratory reagent
 PROC19 - Hand-mixing with intimate contact and only PPE available

Product Name AQUALUN
Sector(s) of use SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste product or used containers according to local regulations
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Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in contained systems Clear transfer lines prior to de-coupling

Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Clear transfer lines prior to de-coupling Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed batch process (synthesis or formulation) Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
Covers concentrations up to	> 25°C

Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Use bulk or semi-bulk handling systems Discharge sacks via suitable vented charge chute Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to	Wear safety glasses with side shields (or goggles)

personal protection, hygiene and health evaluation	Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	> 25°C
Amounts used	Moderate application rate (0.3 - 3 l/minute)
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Stay upwind/keep distance from source Manual
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear a respirator providing a minimum efficiency of 95% Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day

Covers skin contact area up to	820 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Section 3 - Exposure estimation

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Predicted No Effect Concentration (PNEC)

Remarks Qualitative approach used to conclude safe use

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	3.8 mg/kg bw/d
Worker - inhalative, long-term - systemic	13.4 mg/m ³
Consumer - oral, long-term - systemic	1.9 mg/kg bw/d
Consumer - dermal, long-term - systemic	1.9 mg/kg bw/d
Consumer - inhalative, long-term - systemic	3.3 mg/m ³

Calculation method The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated
Used Riskofderm model

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	0.009
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC1 - Use in closed process, no likelihood of exposure	Worker - combined, long-term - systemic		0.02
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.361
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - combined, long-term - systemic		0.467
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.69 mg/kg bw/d	0.182
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.288
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.287
PROC5 - Mixing or blending in batch	Worker - dermal, long-term -	1.371 mg/kg bw/d	0.361

processes for formulation of preparations and articles (multi-stage and/or significant contact)	systemic		
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.467
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.287
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - dermal, long-term - systemic	0.343 mg/kg bw/d	0.09
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - combined, long-term - systemic		0.196
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.089
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC15 - Use as laboratory reagent	Worker - combined, long-term		0.195

	- systemic		
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	1.344 mg/kg bw/d	0.354
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.46

Section 4 - Guidance to check compliance with the exposure scenario

Qualitative approach used to conclude safe use.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMS or a site-specific chemical safety assessment is required. Eyes. ∴ Qualitative approach used to conclude safe use.

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name	AQUALUN
Chemical name	Aluminium sulphate
Pure substance/mixture	Mixture
REACH registration number	01-2119531538-36-XXXX
CAS No	10043-01-3
EC No (EU Index No)	233-135-0
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford GBR
Non-Emergency Telephone Number	+44 1274 267300 / +44 1274 267306
E-mail address	SDS.EMEA@univarsolutions.com

Section 1 - Title

Title	Industrial use
Type	Worker
Main user group	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category(ies)	ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b - Industrial use of reactive processing aids
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
Product Name	AQUALUN
Sector(s) of use	SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
- ERC6b - Industrial use of reactive processing aids

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste product or used containers according to local regulations
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Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).

Technical conditions and measures to control dispersion from source towards the worker	Use in contained systems Clear transfer lines prior to de-coupling
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Clear transfer lines prior to de-coupling Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed batch process (synthesis or formulation) Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to	Use in closed, continuous process with occasional controlled exposure

control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Use bulk or semi-bulk handling systems Discharge sacks via suitable vented charge chute Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	> 25°C
Amounts used	Moderate application rate (0.3 - 3 l/minute)
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Stay upwind/keep distance from source Manual
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear a respirator providing a minimum efficiency of 95%

	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	820 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Section 3 - Exposure estimation

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

- ERC6b - Industrial use of reactive processing aids

Predicted No Effect Concentration (PNEC)

Remarks Qualitative approach used to conclude safe use

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	3.8 mg/kg bw/d
Worker - inhalative, long-term - systemic	13.4 mg/m ³
Consumer - oral, long-term - systemic	1.9 mg/kg bw/d
Consumer - dermal, long-term - systemic	1.9 mg/kg bw/d
Consumer - inhalative, long-term - systemic	3.3 mg/m ³

Calculation method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Used Riskofderm model

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	0.009
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC1 - Use in closed process, no likelihood of exposure	Worker - combined, long-term - systemic		0.02
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.361
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - combined, long-term - systemic		0.467
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.69 mg/kg bw/d	0.182
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.288
PROC4 - Use in batch and other process (synthesis) where opportunity	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181

for exposure arises			
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.287
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.467
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	0.285 mg/m ³	0.021
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.382
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106

weighing)			
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.287
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.089
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		0.195
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	1.344 mg/kg bw/d	0.354
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.46

Section 4 - Guidance to check compliance with the exposure scenario

Qualitative approach used to conclude safe use.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Eyes. ∴ Qualitative approach used to conclude safe use.

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name	AQUALUN
Chemical name	Aluminium sulphate
Pure substance/mixture	Mixture
REACH registration number	01-2119531538-36-XXXX
CAS No	10043-01-3
EC No (EU Index No)	233-135-0
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford GBR
Non-Emergency Telephone Number	+44 1274 267300 / +44 1274 267306
E-mail address	SDS.EMEA@univarsolutions.com

Section 1 - Title

Title	Industrial use
Type	Worker
Main user group	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category(ies)	ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC6 - Calendaring operations 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, pelettising PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
Product Name	AQUALUN
Sector(s) of use	SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste product or used containers according to local regulations
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Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in contained systems Clear transfer lines prior to de-coupling
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Clear transfer lines prior to de-coupling Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed batch process (synthesis or formulation) Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²

Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC6 - Calendaring operations
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with specific activity training Efficiency of at least 95%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor

Process category(ies)	PROC7 - Industrial spraying
Covers concentrations up to	> 25°C
Amounts used	Low application rate (0.03 - 0.3 l/minute)
Exposure duration	Avoid carrying out operation for more than 75 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps Local exhaust ventilation - efficiency of at least 95% Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear a respirator providing a minimum efficiency of 95% Wear suitable working clothes Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	18720 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to	Use in closed, continuous process with occasional controlled exposure

control dispersion from source towards the worker	Use bulk or semi-bulk handling systems Discharge sacks via suitable vented charge chute Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC10 - Roller application or brushing
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least 90% Use long handled tools where possible Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with specific activity training Efficiency of at least 95%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Additional good practice advice beyond the REACH Chemical Safety Report	Avoid splashing
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC13 - Treatment of articles by dipping and pouring
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and	Wear safety glasses with side shields (or goggles) Wear suitable face shield

health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	> 25°C
Amounts used	Moderate application rate (0.3 - 3 l/minute)
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Stay upwind/keep distance from source Manual
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear a respirator providing a minimum efficiency of 95% Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	820 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Section 3 - Exposure estimation

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Predicted No Effect Concentration (PNEC)

Remarks Qualitative approach used to conclude safe use

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	3.8 mg/kg bw/d
Worker - inhalative, long-term - systemic	13.4 mg/m ³
Consumer - oral, long-term - systemic	1.9 mg/kg bw/d
Consumer - dermal, long-term - systemic	1.9 mg/kg bw/d
Consumer - inhalative, long-term - systemic	3.3 mg/m ³

Calculation method The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated
Used Riskofderm model

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	0.009
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC1 - Use in closed process, no likelihood of exposure	Worker - combined, long-term - systemic		0.02
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.361
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - combined, long-term - systemic		0.467
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.69 mg/kg bw/d	0.182
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.288
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.287
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.467
PROC6 - Calendaring operations	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC6 - Calendaring operations	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC6 - Calendaring operations	Worker - combined, long-term - systemic		0.467
PROC7 - Industrial spraying	Worker - dermal, long-term -	1.22 mg/kg bw/d	0.321

	systemic		
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	0.254 mg/m ³	0.019
PROC7 - Industrial spraying	Worker - combined, long-term - systemic		0.34
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	0.285 mg/m ³	0.021
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.382
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.287
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	1.372 mg/kg bw/d	0.361
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC10 - Roller application or brushing	Worker - combined, long-term - systemic		0.372
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361

PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC13 - Treatment of articles by dipping and pouring	Worker - combined, long-term - systemic		0.467
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - dermal, long-term - systemic	0.343 mg/kg bw/d	0.09
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - combined, long-term - systemic		0.196
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.089
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		0.195
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	1.344 mg/kg bw/d	0.354
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.46

Section 4 - Guidance to check compliance with the exposure scenario

Qualitative approach used to conclude safe use.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Eyes. ∴ Qualitative approach used to conclude safe use.

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name	AQUALUN
Chemical name	Aluminium sulphate
Pure substance/mixture	Mixture
REACH registration number	01-2119531538-36-XXXX
CAS No	10043-01-3
EC No (EU Index No)	233-135-0
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford GBR
Non-Emergency Telephone Number	+44 1274 267300 / +44 1274 267306
E-mail address	SDS.EMEA@univarsolutions.com

Section 1 - Title

Title	Professional use
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8b - Wide dispersive indoor use of reactive substances in open systems ERC8e - Wide dispersive outdoor use of reactive substances in open systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
Product Name	AQUALUN
Sector(s) of use	SU22 - Professional uses

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8b - Wide dispersive indoor use of reactive substances in open systems
- ERC8e - Wide dispersive outdoor use of reactive substances in open systems

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste product or used containers according to local regulations
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Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).

Technical conditions and measures to control dispersion from source towards the worker	Use in contained systems Clear transfer lines prior to de-coupling
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Clear transfer lines prior to de-coupling Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed batch process (synthesis or formulation) Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
Covers concentrations up to	> 25°C
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to	Use in closed, continuous process with occasional controlled exposure

control dispersion from source towards the worker	Use bulk or semi-bulk handling systems Discharge sacks via suitable vented charge chute Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	> 25°C
Amounts used	Moderate application rate (0.3 - 3 l/minute)
Exposure duration	Avoid carrying out activities involving exposure for more than 15 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Stay upwind/keep distance from source Manual
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear a respirator providing a minimum efficiency of 95% Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	820 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8b - Wide dispersive indoor use of reactive substances in open systems
- ERC8e - Wide dispersive outdoor use of reactive substances in open systems

**Predicted No Effect Concentration
(PNEC)**

Remarks

Qualitative approach used to conclude safe use

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	3.8 mg/kg bw/d
Worker - inhalative, long-term - systemic	13.4 mg/m ³
Consumer - oral, long-term - systemic	1.9 mg/kg bw/d
Consumer - dermal, long-term - systemic	1.9 mg/kg bw/d
Consumer - inhalative, long-term - systemic	3.3 mg/m ³

Calculation method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

Used Riskofderm model

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	0.009
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC1 - Use in closed process, no likelihood of exposure	Worker - combined, long-term - systemic		0.02
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.361
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - combined, long-term - systemic		0.467
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.69 mg/kg bw/d	0.182
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.288
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.287
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	0.285 mg/m ³	0.021
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.382
PROC8a - Transfer of substance or	Worker - dermal, long-term -	1.371 mg/kg bw/d	0.361

preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	systemic		
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.287
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.089
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		0.195
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	1.344 mg/kg bw/d	0.354
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.247 mg/m ³	0.093
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.447

Section 4 - Guidance to check compliance with the exposure scenario

Qualitative approach used to conclude safe use.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Eyes. ∴ Qualitative approach used to conclude safe use.

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name	AQUALUN
Chemical name	Aluminium sulphate
Pure substance/mixture	Mixture
REACH registration number	01-2119531538-36-XXXX
CAS No	10043-01-3
EC No (EU Index No)	233-135-0
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford GBR
Non-Emergency Telephone Number	+44 1274 267300 / +44 1274 267306
E-mail address	SDS.EMEA@univarsolutions.com

Section 1 - Title

Title	Professional use
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC6 - Calendaring operations 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 PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
Product Name	AQUALUN
Sector(s) of use	SU22 - Professional uses

Section 2 - Operational conditions and risk management measures**Section 2.1 - Control of environmental exposure**

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste product or used containers according to local regulations
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Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in contained systems Clear transfer lines prior to de-coupling
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Indoor/Outdoor use	Indoor

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Clear transfer lines prior to de-coupling Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	480 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed batch process (synthesis or formulation) Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day

exposure	
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
Covers concentrations up to	> 25°C
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Use drum pumps Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC6 - Calendaring operations
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	820 cm2
Indoor/Outdoor use	Indoor

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down and flush system prior to equipment break-in or maintenance Clear spills immediately Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	> 25°C

Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Drain down and flush system prior to equipment break-in or maintenance Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Use in closed, continuous process with occasional controlled exposure Use bulk or semi-bulk handling systems Discharge sacks via suitable vented charge chute Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC10 - Roller application or brushing
Covers concentrations up to	> 25°C
Amounts used	Low application rate (0.03 - 0.3 l/minute)
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least 80% Use long handled tools where possible Clear spills immediately Ensure that spray direction is only downward Ensure that the distance from worker to task is greater than 30 cm
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Additional good practice advice beyond the REACH Chemical Safety Report	Avoid splashing
Covers skin contact area up to	820 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC11 - Non industrial spraying
Covers concentrations up to	> 25°C
Amounts used	Low application rate (0.03 - 0.3 l/minute)
Exposure duration	Avoid carrying out operation for more than 75 minutes

Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Local exhaust ventilation - efficiency of at least 80% Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear a respirator providing a minimum efficiency of 95% Wear suitable working clothes Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	18720 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC13 - Treatment of articles by dipping and pouring
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance Clear spills immediately
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	> 25°C
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Drain down system prior to equipment break-in or maintenance
Conditions and measures related to personal protection, hygiene and	Wear safety glasses with side shields (or goggles) Wear suitable face shield

health evaluation	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a basic standard of general ventilation (1 to 3 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	240 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	> 25°C
Amounts used	Moderate application rate (0.3 - 3 l/minute)
Exposure duration	Avoid carrying out operation for more than 15 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Clear spills immediately Stay upwind/keep distance from source Manual
Conditions and measures related to personal protection, hygiene and health evaluation	Wear safety glasses with side shields (or goggles) Wear suitable face shield Wear a respirator providing a minimum efficiency of 95% Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%
Organisational measures to prevent /limit releases, dispersion and exposure	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) Clean equipment and the work area every day
Covers skin contact area up to	820 cm ²
Indoor/Outdoor use	Indoor
Assumes process temperature up to	40°C

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC)

Remarks Qualitative approach used to conclude safe use

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	3.8 mg/kg bw/d
Worker - inhalative, long-term - systemic	13.4 mg/m ³
Consumer - oral, long-term - systemic	1.9 mg/kg bw/d
Consumer - dermal, long-term - systemic	1.9 mg/kg bw/d
Consumer - inhalative, long-term - systemic	3.3 mg/m ³

Calculation method

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated
Used Riskofderm model

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	0.009
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.143 mg/m ³	0.011
PROC1 - Use in closed process, no likelihood of exposure	Worker - combined, long-term - systemic		0.02

PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.361
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - combined, long-term - systemic		0.467
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.69 mg/kg bw/d	0.182
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.288
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.287
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	0.285 mg/m ³	0.021
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.382
PROC6 - Calendaring operations	Worker - dermal, long-term - systemic	0.44 mg/kg bw/d	0.116
PROC6 - Calendaring operations	Worker - inhalative, long-term - systemic	0.998 mg/m ³	0.074
PROC6 - Calendaring operations	Worker - combined, long-term - systemic		0.19
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106

dedicated facilities			
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.467
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.181
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.287
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	0.76 mg/kg bw/d	0.2
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.285 mg/m ³	0.021
PROC10 - Roller application or brushing	Worker - combined, long-term - systemic		0.221
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	1.22 mg/kg bw/d	0.321
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	1.454 mg/m ³	0.109
PROC11 - Non industrial spraying	Worker - combined, long-term - systemic		0.43
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.361
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC13 - Treatment of articles by dipping and pouring	Worker - combined, long-term - systemic		0.467
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - dermal, long-term - systemic	0.343 mg/kg bw/d	0.09
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC14 - Production of preparations or articles by tableting, compression, extrusion, pelettising	Worker - combined, long-term - systemic		0.196
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.089
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	1.426 mg/m ³	0.106
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		0.195
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	1.344 mg/kg bw/d	0.354
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.247 mg/m ³	0.093
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.447

Section 4 - Guidance to check compliance with the exposure scenario

Qualitative approach used to conclude safe use.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Eyes. ∴ Qualitative approach used to conclude safe use.