

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

Supersedes date 18-Jul-2021

Revision date 14-Nov-2025

Revision Number 4

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

1.1. Product identifier

Product Code(s)	239
Safety data sheet number	239
Product Name	SULPHAMIC ACID
Index No	016-026-00-0
EC Number	226-218-8***
CAS No	5329-14-6
Synonyms	AMIDOSULPHURIC ACID, AMIDOSULPHONIC ACID, AMINOSULPHONIC ACID, SULPHAMIDIC ACID, SULPHAMIC ACID TSA GRADE, SULPHAMIC ACID 99.5%, SULPHAMIC ACID 99.5% TC, SULPHAMIC ACID TS, SULFAMIC ACID MIN. 99.8%, SULPHAMIC ACID FAST SOLUBLE, DETARTRANT BS 12 AM, SULPHAMIC ACID, SULPHAMIC ACID ZW
Pure substance/mixture	Substance

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

Recommended use	Chemical Flame retardant Cleaning agent
Uses advised against	Human tattooing pigment Cosmetics***

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

Skin corrosion/irritation	Category 2 - (H315)
Serious eye damage/eye irritation	Category 2 - (H319)
Chronic aquatic toxicity	Category 3 - (H412)

2.2. Label elements**Signal word**

Warning

Hazard statements

H315 - Causes skin irritation

H319 - Causes serious eye irritation

H412 - Harmful to aquatic life with long lasting effects

Precautionary statements

P264 - Wash face, hands and any exposed skin thoroughly after handling

P273 - Avoid release to the environment

P280 - Wear protective gloves and eye/face protection

P321 - Specific treatment (see .? on this label)

P337 + P313 - If eye irritation persists: Get medical advice/attention

P501 - Dispose of contents/ container to an approved waste disposal plant

2.3. Other hazards

No information available.

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

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)
SULPHAMIC ACID 5329-14-6	90 - 100%	226-218-8 (016-026-00-0)	-	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Aquatic Chronic 3 (H412)	-	-	-

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	Show this safety data sheet to the doctor in attendance.
Inhalation	Remove to fresh air. Get medical attention immediately if symptoms occur.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a doctor.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing. Wear personal protective clothing (see section 8).

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

Symptoms	May cause redness and tearing of the eyes. Burning sensation.
Eyes	May cause redness and tearing of the eyes.
Dermal	Burning sensation. Irritating. Erythema (skin redness). Prolonged contact may cause redness and irritation.

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

Hazardous combustion products	Carbon oxides. Nitrogen oxides (NOx). Oxides of sulphur.
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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. Use personal protection equipment.
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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required.
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.
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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	Remove spillage with vacuum cleaner. If not possible, collect spillage with shovel, broom or the like. Flush area with flooding quantities of water. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.
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. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash it before reuse.
General hygiene considerations	Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep containers tightly closed in a dry, cool and well-ventilated place.
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7.3. Specific end use(s)

Specific use(s)
See section 1 for more information.

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

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
SULPHAMIC ACID 5329-14-6		10 mg/kg/day [4] [6]	

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

Derived No Effect Level (DNEL) - General Public

Chemical name	Oral	Dermal	Inhalation
SULPHAMIC ACID 5329-14-6	5 mg/kg/day [4] [6]	5 mg/kg/day [4] [6]	

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

Predicted No Effect Concentration (PNEC)

Chemical name	Freshwater	Freshwater (intermittent release)	Marine water	Marine water (intermittent release)	Air
SULPHAMIC ACID 5329-14-6	0.048 mg/l		0.0048 mg/l		

Chemical name	Freshwater sediment	Marine sediment	Sewage treatment	Soil	Food chain
SULPHAMIC ACID 5329-14-6	0.173 mg/kg	0.0173 mg/kg		0.00638 mg/kg	2 mg/l

8.2. Exposure controls

Engineering controls No information available.

Personal protective equipment

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields. Wear safety glasses with side shields (or goggles). Use eye protection according to EN 166.

Hand protection Wear suitable gloves. Impervious gloves. Ensure that the breakthrough time of the glove material is not exceeded. Refer to glove supplier for information on breakthrough time for specific gloves. Gloves must conform to standard EN 374.

Gloves			
Duration of contact	PPE - Glove material	Glove thickness	Break through time

Long term (repeated)	Nitrile rubber	0.11 mm	hours 8
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Skin and body protection	Wear suitable protective clothing. Long sleeved clothing.
Respiratory protection	No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.
P1.	
General hygiene considerations	Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Solid
Appearance	Crystalline powder., Crystalline solid
Colour	White., to, Colourless
Odour	Odourless.
Odour threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Melting point / freezing point	205 °C	
Initial boiling point and boiling range		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		No information available.
pH (as aqueous solution)	1.18	solution (1.0 %).
Kinematic viscosity		No information available.
Dynamic viscosity		No information available.
Water solubility	Slightly soluble in water	
Solubility(ies)	21.3 g/100 g @ 20°C	
Partition coefficient	log Pow: < 1	
Vapour pressure	0.78 Pa	
Relative density	2.13 @ 20°C	
Bulk density	1.300 kg/m³	No information available
Liquid Density	No information available	No information available
Relative vapour density	3.35	
Particle characteristics		No information available.
Particle Size	No information available	
Particle Size Distribution	No information available	
Explosive properties	No information available	
Oxidising properties	Does not meet the criteria for classification as oxidising	

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity Stable under recommended storage conditions.

10.2. Chemical stability

Stability Stable under normal conditions.

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 moisture. Excessive heat.

10.5. Incompatible materials

Incompatible materials Strong acids. Strong bases. Strong oxidising agents.

10.6. Hazardous decomposition products

Hazardous decomposition products Nitrogen oxides (NOx). Oxides of sulphur.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure

Product Information

Inhalation	Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract.
Eye contact	Specific test data for the substance or mixture is not available. Causes serious eye irritation. (based on components). May cause redness, itching, and pain.
Skin contact	Specific test data for the substance or mixture is not available. Causes skin irritation. (based on components). Causes skin irritation.
Ingestion	Specific test data for the substance or mixture is not available. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Gastrointestinal discomfort.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Redness. May cause redness and tearing of the eyes.

Acute toxicity

Numerical measures of toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
SULPHAMIC ACID	= 1450 mg/kg (Rat)	> 2000 mg/kg (Rat)	-

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

Skin corrosion/irritation	Classification based on data available for ingredients. Causes skin irritation.
Serious eye damage/eye irritation	Classification based on data available for ingredients. Causes serious eye irritation.
Respiratory or skin sensitisation	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	No information available.
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Aspiration hazard	No information available.
Other adverse effects	No information available.

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

Ecotoxicity Harmful to aquatic life with long lasting effects.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
SULPHAMIC ACID	EC50: =48.0mg/L (72h, Scenedesmus Subspicatus)	LC50: =14.2mg/L (96h, Pimephales promelas)	EC50: =200.0mg/L (3h, Activated Sludge)	EC50: =71.6mg/L (48h, Daphnia Magna)

12.2. Persistence and degradability

Persistence and degradability No information available.

12.3. Bioaccumulative potential

Bioaccumulation There is no data for this product.

12.4. Mobility in soil

Mobility in soil slightly soluble.

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
SULPHAMIC ACID	The substance is not PBT / vPvB PBT assessment does not apply***

12.6. Other adverse effects

No information available.

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

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

SECTION 14: Transport information**IATA**

14.1 UN number or ID number	UN2967
14.2 UN proper shipping name	SULPHAMIC ACID
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	No
14.6 Special precautions for user	
Special Provisions	A803
ERG Code	8L

IMDG

14.1 UN number or ID number	UN2967
14.2 UN proper shipping name	SULPHAMIC ACID
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	No
14.6 Special precautions for user	
Special Provisions	None
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	UN2967
14.2 UN proper shipping name	SULPHAMIC ACID
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	No
14.6 Special precautions for user	
Special Provisions	None
Classification code	C2

ADR

14.1 UN number or ID number	UN2967
14.2 UN proper shipping name	SULPHAMIC ACID
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazards	No
14.6 Special precautions for user	
Special Provisions	None
Classification code	C2
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 does not contain substances subject to authorisation (UK REACH - Annex XIV).

This product does not contain substances subject to restriction (UK REACH - Annex XVII).

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/NDSL	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/NDSL - 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

A Chemical Safety Assessment has been carried out for this substance

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

H315 - Causes skin irritation
 H319 - Causes serious eye irritation
 H412 - Harmful to aquatic life with long lasting effects

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 ***Indicates updated data since last publication

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 Jitendra Panchal

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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]

Chemical name Sulfamic acid
Pure substance/mixture Substance
REACH registration number 01-2119488633-28-XXXX
CAS No 5329-14-6
EC No (EU Index No) 226-218-8
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
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) 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
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)

Amounts used

Type	Daily amount per site
Value	<= 9
Units	t(ons)/year

Type	Annual amount per site
Value	<= 2000
Units	t(ons)/year

Type	Fraction of EU tonnage used in region
Value	100%

Other operational conditions of use affecting environmental exposure

Emission days	>= 220
Release fraction to air from process (initial release prior to RMM)	2.5%
Release fraction to wastewater from process (initial release prior to RMM)	2%

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	>= 2000 m3/d
Removal efficiency fraction (offsite; STP)	90%
Sludge treatment	Controlled application to agricultural soil

Environmental factors not influenced by risk management

Remarks	Receiving surface water flow >= 18000 m3/d
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Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations
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Control of worker exposure

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use

Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
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	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor use

Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Section 3 - Exposure estimation

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.8 mg/l
Freshwater sediment	8.36 mg/kg dw
Marine water	0.18 mg/l
Marine sediment	0.84 mg/kg dw
Soil	5 mg/kg dw
Impact on Sewage Treatment	20 mg/l

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	1.11 mg/l	0.617
Marine water	0.111 mg/l	0.615

Freshwater sediment	5.158 mg/kg dw	0.617
Marine sediment	0.515 mg/kg dw	0.613
STP: Sewage Treatment Plant	8.988 mg/l	0.449
Soil	0.238 mg/kg dw	0.048

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	10 mg/kg bw/d
Worker - inhalative, long-term - systemic	70.5 mg/m ³
Consumer - oral, long-term - systemic	5 mg/kg bw/d
Consumer - dermal, long-term - systemic	5 mg/kg bw/d
Consumer - inhalative, long-term - systemic	17.4 mg/m ³

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.069 mg/kg bw/d	< 0.01
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		< 0.01
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.069
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.076
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
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	0.137
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.144
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
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	0.137
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.144
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC8b - Transfer of substance or	Worker - dermal, long-term -	1.371 mg/kg bw/d	0.137

preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	systemic		
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.138
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
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	0.069
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.07
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.034
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		0.035

Section 4 - Guidance to check compliance with the exposure scenario

Used ECETOC TRA model. 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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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

Chemical name Sulfamic acid
Pure substance/mixture Substance
REACH registration number 01-2119488633-28-XXXX
CAS No 5329-14-6
EC No (EU Index No) 226-218-8
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) ERC6b - Industrial use of reactive processing aids
Process category(ies) 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)
 PROC7 - Industrial spraying
 PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
 PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
 PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
 PROC10 - Roller application or brushing
 PROC13 - Treatment of articles by dipping and pouring
 PROC15 - Use as laboratory reagent
 PROC19 - Hand-mixing with intimate contact and only PPE available

Sector(s) of use SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
 SU6b - Manufacture of pulp, paper and paper products SU8 - Manufacture of bulk, large scale chemicals (including petroleum products) SU15 - Manufacture of fabricated metal products, except machinery and equipment

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC6b - Industrial use of reactive processing aids

Amounts used

Type	Daily amount per site
Value	<= 4500
Units	kg/d

Type	Annual amount per site
Value	<= 1500
Units	t(ons)/year

Type	Fraction of EU tonnage used in region
Value	100%

Other operational conditions of use affecting environmental exposure

Emission days	>= 220
Release fraction to air from process (initial release prior to RMM)	0.1%
Release fraction to wastewater from process (initial release prior to RMM)	5%

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	>= 2000 m3/d
Removal efficiency fraction (offsite; STP)	90%
Sludge treatment	Controlled application to agricultural soil

Environmental factors not influenced by risk management

Remarks	Receiving surface water flow >= 18000 m3/d
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Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations
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Control of worker exposure

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%

health evaluation	Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

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	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC7 - Industrial spraying
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin

	Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	1500 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90%

health evaluation	Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC10 - Roller application or brushing
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	960 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC13 - Treatment of articles by dipping and pouring
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	480 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC15 - Use as laboratory reagent
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately

	Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	240 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)
Process category(ies)	PROC19 - Hand-mixing with intimate contact and only PPE available
Covers concentrations up to	100%
Physical form of product	Solid, low dustiness Powder
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Provide a basic standard of general ventilation (1 to 3 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Efficiency of at least 90% Wear suitable coveralls to prevent exposure to the skin Keep working clothes separately Remove and wash contaminated clothing and gloves, including the inside, before re-use
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day
Covers skin contact area up to	1980 cm2
Indoor/Outdoor use	Indoor use
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Section 3 - Exposure estimation

Environmental release category(ies) - ERC6b - Industrial use of reactive processing aids

Predicted No Effect Concentration (PNEC)

Freshwater	1.8 mg/l
Freshwater sediment	8.36 mg/kg dw
Marine water	0.18 mg/l
Marine sediment	0.84 mg/kg dw
Soil	5 mg/kg dw
Impact on Sewage Treatment	20 mg/l

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	1.335 mg/l	0.742
Marine water	0.1335 mg/l	0.74
Freshwater sediment	6.202 mg/kg dw	0.742
Marine sediment	0.619 mg/kg dw	0.737
STP: Sewage Treatment Plant	11.24 mg/l	0.562
Soil	0.206 mg/kg dw	0.041

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	10 mg/kg bw/d
Worker - inhalative, long-term - systemic	70.5 mg/m ³
Consumer - oral, long-term - systemic	5 mg/kg bw/d
Consumer - dermal, long-term - systemic	5 mg/kg bw/d
Consumer - inhalative, long-term - systemic	17.4 mg/m ³

Process category(ies)	Exposure route	predicted exposure level	Risk characterisation ratio (RCR)
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	0.01 mg/m ³	< 0.01
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.137 mg/kg bw/d	0.014
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		0.014
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.069 mg/kg bw/d	< 0.01
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - combined, long-term - systemic		< 0.01
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.686 mg/kg bw/d	0.069
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - combined, long-term - systemic		0.076
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
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	0.137
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - combined, long-term - systemic		0.144
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	1 mg/m ³	0.014
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	4.286 mg/kg bw/d	0.429
PROC7 - Industrial spraying	Worker - combined, long-term - systemic		0.443
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
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	0.137
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - combined, long-term - systemic		0.144
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
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	0.137

dedicated facilities			
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - combined, long-term - systemic		0.138
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
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	0.069
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - combined, long-term - systemic		0.07
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.5 mg/m ³	< 0.01
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.743 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - combined, long-term - systemic		0.281
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	1.371 mg/kg bw/d	0.137
PROC13 - Treatment of articles by dipping and pouring	Worker - combined, long-term - systemic		0.138
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	0.1 mg/m ³	< 0.01
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.034 mg/kg bw/d	< 0.01
PROC15 - Use as laboratory reagent	Worker - combined, long-term - systemic		< 0.01
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	0.3 mg/m ³	< 0.01
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	8.486 mg/kg bw/d	0.849
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - combined, long-term - systemic		0.853

Section 4 - Guidance to check compliance with the exposure scenario

Used ECETOC TRA model. 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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.