

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006, as amended by
Commission Regulation (EU) 2020/878



Ammonia solution <25%

Version
1.0

Revision Date:
29.07.2026

Date of last issue: -
Date of first issue: 29.07.2026

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

1.1 Product identifier

Trade name : Aqueous Ammonia, Aqueous Ammonia Novo

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

Use of the Substance/Mixture : Use as an intermediate, Processing aid, Additive, Laboratory use, Water treatment chemical, Fertilizers, Coatings and paints, thinners, paint removers, Polishes and wax blends, Washing and cleaning products, Cosmetics, personal care products

1.3 Details of the supplier of the safety data sheet

Supplier : AGF Nitrogen Ammonia Distribution B.V.
Wolgaweg 31,
3198 LR Europoort Rotterdam
The Netherlands
<https://documentation.agf-nitrogen.nl/>

E-mail address : info.aad@agf-nitrogen.nl

1.4 Emergency telephone number

01 8092566 / 01 8379964 National Poisons Information Centre (24h)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4	H332: Harmful if inhaled.
Skin corrosion, Category 1	H314: Causes severe skin burns and eye damage.
Specific target organ toxicity - single exposure, Category 3, Respiratory system	H335: May cause respiratory irritation.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

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Hazard pictograms

:



Signal word

:

Danger

Hazard statements

:

H314 Causes severe skin burns and eye damage.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

:

Prevention:

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER/doctor/physician if you feel unwell.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Hazardous components which must be listed on the label:

ammonia

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical nature : Ammonia solution

Ammonia anhydrous (EC No 231-653-3) has been registered.
REACH registration number: 01-2119488876-14-0249

Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
ammonia	1336-21-6 215-647-6 007-001-01-2	Acute Tox. 4; H332 Skin Corr. 1B; H314 Eye Dam. 1; H318 STOT SE 3; H335 (Respiratory system) Aquatic Acute 1; H400 Aquatic Chronic 2; H411 M-Factor (Acute aquatic toxicity): 1 specific concentration limit STOT SE 3; H335 >= 5 % Acute toxicity esti- mate Acute inhalation tox- icity (gas): 3285 ppm	>= 20 - < 25

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Remove from exposure.
Obtain medical attention.

Protection of first-aiders : First Aid responders should pay attention to self-protection
and use the recommended protective clothing

If inhaled : Move to fresh air.
Victim to lie down in the recovery position, cover and keep him

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- warm.
Oxygen or artificial respiration if needed.
- In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes.
Take off contaminated clothing and shoes immediately.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Remove contact lenses.
Continue rinsing eyes during transport to hospital.
Immediate medical attention is required.
- If swallowed : Rinse mouth with water.
Do NOT induce vomiting.
If conscious, drink plenty of water.
Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : Inhalation may provoke the following symptoms:
Shortness of breath
Cough
Sore throat
Risk of delayed pulmonary oedema.
- Skin and eye contact:
Redness
Burn
Pain
- If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.
- Risks : Causes serious eye damage.
Harmful if inhaled.
May cause respiratory irritation.
Causes severe burns.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Keep under medical supervision for at least 48 hours.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water spray
Dry chemical
Foam
Carbon dioxide (CO₂)

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5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Not combustible.
Hazardous decomposition products formed under fire conditions.
Ammonia
Nitrogen oxides (NO_x)

5.3 Advice for firefighters

Special protective equipment for firefighters : Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus.

Further information : Cool containers/tanks with water spray.
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Container may explode if heated.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Avoid inhalation of vapour or mist.
Ensure adequate ventilation.
Wear personal protective equipment.
Evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.

6.2 Environmental precautions

Environmental precautions : Prevent further leakage or spillage if safe to do so.
Prevent product from entering environment and drains.
Do not flush into surface water or sanitary sewer system.
Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Attempt to stop leakage without personal risk.
Dilute with plenty of water.
Use neutralizing agents.
Large spills should be collected mechanically (remove by pumping) for disposal.
Suppress (knock down) gases/vapours/mists with water spray.
Ventilate the area.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Advice on safe handling : Avoid inhalation, ingestion and contact with skin and eyes.
Use personal protective equipment.
Use only outdoors or in a well-ventilated area.
Warning: development of pressure possible in tightly closed containers.
Handle and open container with care.
Wash hands before breaks and immediately after handling the product.
Take off contaminated clothing and wash before reuse.
Ensure that eyewash stations and safety showers are close to the workstation location.
- Advice on protection against fire and explosion : Keep away from sources of ignition - No smoking. Vapours may form explosive mixtures with air. Take precautionary measures against static discharges.
- Hygiene measures : Wash contaminated clothing before re-use.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : Keep container tightly closed. Keep in a cool, well ventilated place away from acids. Store away from sources of heat, ignition and direct sunlight. Keep locked up or in an area accessible only to qualified or authorised persons. Keep away from incompatible materials.
- Suitable materials for containers: Stainless steel glass Polypropylene Polyethylene

7.3 Specific end use(s)

- Specific use(s) : Not applicable

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
ammonia, anhydrous	7664-41-7	STEL	50 ppm 36 mg/m ³	2000/39/EC
	Further information: Indicative			
		TWA	20 ppm 14 mg/m ³	2000/39/EC
	Further information: Indicative			
		OELV - 8 hrs	20 ppm	IE OEL

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		(TWA)	14 mg/m ³	
		OELV - 15 min (STEL)	50 ppm 36 mg/m ³	IE OEL

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
ammonia	Workers	Inhalation	Acute local effects	36 mg/m ³
	Workers	Inhalation	Acute systemic effects	47.6 mg/m ³
	Workers	Inhalation	Long-term local effects	14 mg/m ³
	Workers	Inhalation	Long-term systemic effects	47.6 mg/m ³
	Workers	Skin contact	Acute systemic effects	6.8 mg/kg bw/day
	Workers	Skin contact	Long-term systemic effects	6.8 mg/kg bw/day
	Consumers	Ingestion	Acute systemic effects	6.8 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	6.8 mg/kg bw/day
	Consumers	Inhalation	Acute local effects	7.2 mg/m ³
	Consumers	Inhalation	Acute systemic effects	23.8 mg/m ³
	Consumers	Inhalation	Long-term local effects	2.8 mg/m ³
	Consumers	Inhalation	Long-term systemic effects	23.8 mg/m ³
	Consumers	Skin contact	Acute systemic effects	6.8 mg/kg bw/day
	Consumers	Skin contact	Long-term systemic effects	6.8 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
ammonia	Fresh water	0.00135 mg/l
	Marine water	0.00135 mg/l
	Intermittent use/release	0.0083 mg/l
	Soil	0.0221 mg/kg dry weight (d.w.)

8.2 Exposure controls

Engineering measures

Avoid inhalation of vapour or mist.
Provide adequate ventilation.

Personal protective equipment

Eye/face protection : Safety goggles
(EN 166)

Hand protection

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Material : Viton®
Break through time : 480 min
Glove thickness : 0.7 mm

Material : butyl-rubber
Break through time : 480 min
Glove thickness : 0.7 mm

Remarks : The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

Skin and body protection : Wear suitable protective clothing and rubber boots.

Respiratory protection : In the case of vapour formation use a respirator with an approved filter.
(K or ABEK-filter)
Prolonged exposure:
Self-contained breathing apparatus (EN 133)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : liquid

Form : Aqueous solution

Colour : colourless, pale yellowish

Odour : pungent

Odour Threshold : 5 - 25 ppm
(NH₃)

Melting range : -56 - -37 °C (1,013 hPa)

Boiling range : 38 - 45 °C (1,013 hPa)

Flammability : The product is not flammable.

Upper explosion limit / Upper : 26 %(V)

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flammability limit

Lower explosion limit / Lower
flammability limit : 16 %(V)

Flash point : No flash point was obtained, but the product may release
flammable vapour.

Auto-ignition temperature : No data available

Decomposition temperature : No data available

pH : • 13 (20 °C)

Viscosity
Viscosity, kinematic : No data available

Solubility(ies)
Water solubility : completely miscible

Partition coefficient: n-
octanol/water : Not applicable
(inorganic)

Vapour pressure : 48 kPa (20 °C)

Density : 0.910 - 0.924 g/cm³ (15 °C)

Relative vapour density : 0.59
(NH₃)
(Air = 1.0)

9.2 Other information

Explosives : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Self-ignition • 651 °C
(NH₃)
•

Evaporation rate : No data available

Molecular weight : 35.04 g/mol

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SECTION 10: Stability and reactivity

10.1 Reactivity

Stable at normal ambient temperature and pressure.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Vapours may form explosive mixtures with air.
Reacts with common metals liberating hydrogen.
Reacts violently with:
Strong acids

10.4 Conditions to avoid

Conditions to avoid : Keep away from heat and sources of ignition.

10.5 Incompatible materials

Materials to avoid : Strong acids
Strong oxidizing agents
Heavy metals and their salts
Copper
Zinc
Aluminium
Hypochlorites
Mercury

10.6 Hazardous decomposition products

Ammonia
Nitrogen oxides (NO_x)

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Harmful if inhaled.

Product:

Acute inhalation toxicity : Acute toxicity estimate: 13141 ppm
Exposure time: 4 h
Test atmosphere: gas
Method: Calculation method

Components:

ammonia:

Acute oral toxicity : Remarks: study scientifically unjustified
(gaseous)
(corrosive)

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Acute inhalation toxicity : LC50 (Rat, male): 3285 ppm
Exposure time: 4 h
Test atmosphere: gas
Test substance: ammonia, anhydrous

Acute dermal toxicity : Remarks: study scientifically unjustified
(corrosive)

Skin corrosion/irritation

Causes severe burns.

Components:

ammonia:

Remarks : study scientifically unjustified
(corrosive)

Serious eye damage/eye irritation

Causes serious eye damage.

Components:

ammonia:

Remarks : study scientifically unjustified
(corrosive)

Respiratory or skin sensitisation

Skin sensitisation

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

Respiratory sensitisation

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

Components:

ammonia:

Remarks : study scientifically unjustified
(corrosive)

Germ cell mutagenicity

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

Components:

ammonia:

Genotoxicity in vitro : Test Type: Ames test
Method: OECD Test Guideline 471
Result: negative
Test substance: ammonia, anhydrous
Remarks: In vitro tests did not show mutagenic effects

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Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse
Method: OECD Test Guideline 474
Test substance: ammonium chloride
Remarks: Read-across (Analogy)
In vivo tests did not show mutagenic effects

Carcinogenicity

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

Components:

ammonia:

Species : Rat, male and female
Application Route : Oral
Activity duration : 104 Weeks
NOAEL : 350 mg/kg bw/day
Method : OECD Test Guideline 453
Test substance : Ammonium sulphate
Remarks : Read-across (Analogy)
Animal testing did not show any carcinogenic effects.

Reproductive toxicity

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

Components:

ammonia:

Effects on foetal development : Species: Rabbit
Application Route: Oral
Developmental Toxicity: NOAEL: 14.5 mg/kg bw/day
Symptoms: No adverse effects
Method: OECD Test Guideline 414

Species: Guinea pig
Application Route: Inhalation
Developmental Toxicity: NOEC: 25 mg/m³
Symptoms: No adverse effects

STOT - single exposure

May cause respiratory irritation.

Components:

ammonia:

Assessment : May cause respiratory irritation.

STOT - repeated exposure

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

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Repeated dose toxicity

Components:

ammonia:

Species	: Rat, male and female
NOAEL	: 68 mg/kg bw/day
Application Route	: Oral
Exposure time	: 35 d
Method	: OECD Test Guideline 422
Test substance	: Diammonium phosphate
Target Organs	: Kidney, Liver
Remarks	: Read-across (Analogy)

Species	: Rat, male
NOEC	: 35 mg/m ³
Application Route	: Inhalation
Exposure time	: 50 d

Aspiration toxicity

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

11.2 Information on other hazards

Endocrine disrupting properties

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

Product:

Assessment	: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
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SECTION 12: Ecological information

12.1 Toxicity

Product:

Ecotoxicology Assessment

Acute aquatic toxicity	: Not classified
Chronic aquatic toxicity	: Harmful to aquatic life with long lasting effects.

Components:

ammonia:

Toxicity to fish	: LC50 (pink salmon (<i>Oncorhynchus gorbuscha</i>)): 0.083 mg/l Exposure time: 96 h Test Type: Short term
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	Test substance: Ammonium sulphate Remarks: Read-across (Analogy) Fresh water
Toxicity to daphnia and other aquatic invertebrates	: LC50 (Daphnia magna (Water flea)): 101 mg/l Exposure time: 48 h Test Type: Short term Method: ASTM E 729-80 Remarks: Fresh water EC50 (Acacia sinensis): 10 mg/l Exposure time: 48 h Remarks: Marine water
Toxicity to algae/aquatic plants	: EC50 (Chlorella vulgaris (Fresh water algae)): 3,283.2 mg/l Exposure time: 18 d Test substance: Ammonium sulphate Method: OECD Test Guideline 201 Remarks: Read-across (Analogy) Fresh water NOEC (Zostera marina (seagrass)): 0.153 mg/l Remarks: Marine water
M-Factor (Acute aquatic toxicity)	: 1
Toxicity to fish (Chronic toxicity)	: NOEC: 0.0135 mg/l Exposure time: 73 d Species: Oncorhynchus mykiss (rainbow trout) Test substance: ammonium chloride Method: OECD Test Guideline 210 Remarks: Read-across (Analogy) Fresh water
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC: 0.961 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Test substance: ammonium chloride Method: EPA OPPTS 850.1300 Remarks: Read-across (Analogy) Fresh water
Plant toxicity	: NOEC: 0.221 mg/kg Species: barley

12.2 Persistence and degradability

Components:

ammonia:

Biodegradability : Result: Readily biodegradable.

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12.3 Bioaccumulative potential

Components:

ammonia:

Bioaccumulation : Remarks: Does not bioaccumulate.

12.4 Mobility in soil

Components:

ammonia:

Mobility : Remarks: After release, adsorbs onto soil.

Distribution among environmental compartments : Adsorption/Soil
log K_{oc}: 5
Remarks: Adsorbs on soil.

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:

Additional ecological information : Harmful to aquatic life with long lasting effects.
In the aqueous environment, ammonia is present predominantly as ammonium ion (NH₄⁺) or as ammonia (NH₃); the relative proportions are dependent on pH. Toxicity to aquatic organisms is attributed to un-ionised ammonia (NH₃).
Do not allow product to reach ground water, water bodies or sewage system.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Dispose of in accordance with local regulations. Solutions with high pH-value must be neutralized before discharge. pH should be in the range of 6 - 9.
		European waste code: 06 02 03* (ammonium hydroxide)
Contaminated packaging	:	Empty remaining contents. Dispose of contents/ container to an approved waste disposal plant.

SECTION 14: Transport information

14.1 UN number or ID number

ADR	:	UN 2672
RID	:	UN 2672
IMDG	:	UN 2672

14.2 UN proper shipping name

ADR	:	AMMONIA SOLUTION
RID	:	AMMONIA SOLUTION
IMDG	:	AMMONIA SOLUTION

14.3 Transport hazard class(es)

	Class	Subsidiary risks
ADR	:	8
RID	:	8
IMDG	:	8

14.4 Packing group

ADR		
Packing group	:	III
Classification Code	:	C5
Hazard Identification Number	:	80
Labels	:	8
Tunnel restriction code	:	(E)
RID		
Packing group	:	III
Classification Code	:	C5

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Hazard Identification Number : 80
Labels : 8

IMDG

Packing group : III
Labels : 8
EmS Code : F-A, S-B

14.5 Environmental hazards

ADR

Environmentally hazardous : no

RID

Environmentally hazardous : no

IMDG

Marine pollutant : yes

14.6 Special precautions for user

Remarks : SDS: No specific instructions needed.

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Maritime transport in bulk according to IMO instruments

Ship type : 2
Pollution category : Y
Remarks : Correct technical name:, Ammonia solution

SECTION 15: Regulatory information

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

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) : Conditions of restriction for the following entries should be considered:
Number on list 3

Number on list 75: If you intend to use this product as tattoo ink, please contact your vendor.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Not applicable

Regulation (EU) No 2024/590 on substances that deplete the ozone layer : Not applicable

Regulation (EU) 2019/1021 on persistent organic pollutants (recast) : Not applicable

REACH - List of substances subject to authorisation : Not applicable

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(Annex XIV)

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Not applicable

Other regulations:

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.
ammonia, anhydrous

SECTION 16: Other information

Full text of H-Statements

H314	: Causes severe skin burns and eye damage.
H318	: Causes serious eye damage.
H332	: Harmful if inhaled.
H335	: May cause respiratory irritation.
H400	: Very toxic to aquatic life.
H411	: Toxic to aquatic life with long lasting effects.
H335	: May cause respiratory irritation.

Full text of other abbreviations

Acute Tox.	: Acute toxicity
Aquatic Acute	: Short-term (acute) aquatic hazard
Aquatic Chronic	: Long-term (chronic) aquatic hazard
Eye Dam.	: Serious eye damage
Skin Corr.	: Skin corrosion
STOT SE	: Specific target organ toxicity - single exposure
STOT SE	: Specific target organ toxicity - single exposure
2000/39/EC	: Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
IE OEL	: Ireland. List of Chemical Agents and Carcinogens with Occupational Exposure Limit Values - Code of Practice, Schedule 1 and 2
2000/39/EC / TWA	: Limit Value - eight hours
2000/39/EC / STEL	: Short term exposure limit
IE OEL / OELV - 8 hrs (TWA)	: Occupational exposure limit value (8-hour reference period)
IE OEL / OELV - 15 min (STEL)	: Occupational exposure limit value (15-minute reference period)

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ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Training advice : Provide adequate information, instruction and training for operators.
Regular trainings of all employees which are involved in the transport of dangerous goods (according to chapter 1.3 ADR).

Sources of key data used to compile the Safety Data Sheet : Chemical Safety Report, Anhydrous Ammonia. FARM REACH Consortium, 2023
Fertilizers Europe Guidance documents

Classification of the mixture:

Acute Tox. 4	H332
Skin Corr. 1	H314
STOT SE 3	H335
Aquatic Chronic 3	H412

Classification procedure:

Calculation method
Based on product data or assessment
Calculation method
Based on product data or assessment

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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. However we do not assume any warranty and liability whatsoever for the accuracy and completeness of such information.

We herewith also do not make any representation or warranty of merchantability of our products or their fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

The information contained herein relates exclusively to our products when not used in conjunction with any third party materials. No liability can be accepted especially in respect of the use of our products in conjunction with other material or substance.

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Annex: Exposure Scenarios

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Number	Title
ES1	Formulation or re-packing , Formulation & (re)packing of substances and mixtures; Adhesives, sealants (PC1); Coatings and paints, thinners, paint removers (PC9a); Fertilizers (PC12); Ink and toners (PC18); Intermediate (PC19); Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20); Laboratory chemicals (PC21); Paper and board treatment products (PC26); Pharmaceuticals (PC29); Photo-chemicals (PC30); Textile dyes and impregnating products (PC34); Washing and cleaning products (PC35); Water treatment chemicals (PC37); Cosmetics, personal care products (PC39); Extraction agents (PC40)
ES2	Use at industrial sites , Use as an intermediate; Intermediate (PC19)
ES3	Use at industrial sites , Flue gas for NOx and SOx reduction, Processing aid, an auxiliary agent in different processes; Adhesives, sealants (PC1); Coatings and paints, thinners, paint removers (PC9a); Metal surface treatment products (PC14); Non-metal surface treatment products (PC15); Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20); Paper and board treatment products (PC26); Pharmaceuticals (PC29); Photo-chemicals (PC30); Textile dyes and impregnating products (PC34); Washing and cleaning products (PC35); Water treatment chemicals (PC37); Cosmetics, personal care products (PC39); Extraction agents (PC40)
ES4	Widespread use by professional workers , Processing aid; Coatings and paints, thinners, paint removers (PC9a); Fertilizers (PC12); Metal surface treatment products (PC14); Non-metal surface treatment products (PC15); Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20); Laboratory chemicals (PC21); Pharmaceuticals (PC29); Textile dyes and impregnating products (PC34); Washing and cleaning products (PC35); Water treatment chemicals (PC37); Extraction agents (PC40)
ES5	Consumer use , Use in coatings; Coatings and paints, thinners, paint removers (PC9a)
ES6	Consumer use , Use in cleaning agents; Washing and cleaning products (PC35)
ES7	Consumer use , Uses in cosmetics/personal care products, perfumes and fragrances; Cosmetics, personal care products (PC39)

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ES1: Formulation & (re)packing of substances and mixtures

1.1. Title section

Structured Short Title	: Formulation or re-packing, Formulation & (re)packing of substances and mixtures; Adhesives, sealants (PC1).; Coatings and paints, thinners, paint removers (PC9a).; Fertilizers (PC12).; Ink and toners (PC18).; Intermediate (PC19).; Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20).; Laboratory chemicals (PC21).; Paper and board treatment products (PC26).; Pharmaceuticals (PC29).; Photo-chemicals (PC30).; Textile dyes and impregnating products (PC34).; Washing and cleaning products (PC35).; Water treatment chemicals (PC37).; Cosmetics, personal care products (PC39).; Extraction agents (PC40).
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Environment		
CS1	Formulation & (re)packing of substances and mixtures	ERC2
Worker		
CS2	Use in closed process, no likelihood of exposure	PROC1
CS3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS4	Use in closed batch process (synthesis or formulation)	PROC3
CS5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS6	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS8	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS10	Use as laboratory reagent	PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Formulation into mixture (ERC2)

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Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 3830000 tonnes/year
Daily amount per site	: 1819 tonnes/day
Emission days	: 100
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

1.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure

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Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

**1.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation)
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)**

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

**1.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises
Chemical production where opportunity for exposure arises (PROC4)**

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Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.6. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) Mixing or blending in batch processes (PROC5)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	

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Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.8. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers use up to 4 h

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Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Respiratory protection	
Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

1.2.9. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation	
Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.10. Control of worker exposure: Use as laboratory reagent Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	

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Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Formulation into mixture (ERC2)

Release route	Release rate	Release estimation method
Air	0.003 %	spERC -2 – NH4
Water	0 %	spERC -2 – NH4
Soil	0 %	spERC -2 – NH4

Compartment	Exposure level	RCR
Freshwater	0.057 µg/L (EUSES v2.1)	0.04
Marine water	0.0057 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.317 µg/kg dry weight (EUSES v2.1)	< 0.01

1.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	0.0043 mg/m ³ (EASY TRA v5.2.0)	< 0.01	

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dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		< 0.01	

1.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	10.64 mg/m ³ (EASY TRA v5.2.0)	0.224	
dermal	systemic	long-term	0.823 mg/kg bw/day (EASY TRA v5.2.0)	0.121	
combined routes	systemic	long-term		0.345	

1.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³ (EASY TRA v5.2.0)	0.188	
dermal	systemic	long-term	0.247 mg/kg bw/day (EASY TRA v5.2.0)	0.036	
combined routes	systemic	long-term		0.224	

1.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	4.258 mg/m ³ (EASY TRA v5.2.0)	0.089	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.102	

1.3.6. Worker exposure: Mixing or blending in batch processes (PROC5)

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Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	10.64 mg/m ³ (EASY TRA v5.2.0)	0.224	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.236	

1.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	6.387 mg/m ³ (EASY TRA v5.2.0)	0.134	
dermal	systemic	long-term	1.646 mg/kg bw/day (EASY TRA v5.2.0)	0.242	
combined routes	systemic	long-term		0.376	

1.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.682 mg/m ³ (EASY TRA v5.2.0)	0.056	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.202	

1.3.9. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.516 mg/m ³ (EASY TRA v5.2.0)	0.179	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	

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			TRA v5.2.0)		
combined routes	systemic	long-term		0.191	

1.3.10. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.129 mg/m ³ (EASY TRA v5.2.0)	0.045	
dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		0.048	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES2: Use as an intermediate

2.1. Title section

Structured Short Title	: Use at industrial sites, Use as an intermediate; Intermediate (PC19).
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Environment		
CS1	Use as an intermediate	ERC6a
Worker		
CS2	Use in closed process, no likelihood of exposure	PROC1
CS3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS4	Use in closed batch process (synthesis or formulation)	PROC3
CS5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS8	Use as laboratory reagent	PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use of intermediate (ERC6a)

Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 3830000 tonnes/year
Daily amount per site	: 225 tonnes/day
Emission days	: 100
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d

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Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

2.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

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Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation)
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

2.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises
Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	

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Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers use up to 4 h
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Dermal - minimum efficiency of 80 %	
Respiratory protection	
Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

2.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours

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Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.8. Control of worker exposure: Use as laboratory reagent Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Use of intermediate (ERC6a)

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Release route	Release rate	Release estimation method
Water	0 %	spERC -6a – NH ₄
Air	0.005 %	spERC -6a – NH ₄
Soil	0 %	spERC -6a – NH ₄

Compartment	Exposure level	RCR
Freshwater	0.067 µg/L (EUSES v2.1)	0.05
Marine water	0.0068 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.287 µg/kg dry weight (EUSES v2.1)	0.01

2.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	0.0043 mg/m ³ (EASY TRA v5.2.0)	< 0.01	
dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		< 0.01	

2.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	10.64 mg/m ³ (EASY TRA v5.2.0)	0.224	
dermal	systemic	long-term	0.823 mg/kg bw/day (EASY TRA v5.2.0)	0.121	
combined routes	systemic	long-term		0.345	

2.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³	0.188	

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			(EASY TRA v5.2.0)		
dermal	systemic	long-term	0.247 mg/kg bw/day (EASY TRA v5.2.0)	0.036	
combined routes	systemic	long-term		0.224	

2.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	4.258 mg/m ³ (EASY TRA v5.2.0)	0.089	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.102	

2.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.682 mg/m ³ (EASY TRA v5.2.0)	0.056	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.202	

2.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.516 mg/m ³ (EASY TRA v5.2.0)	0.179	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.191	

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2.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.129 mg/m ³ (EASY TRA v5.2.0)	0.045	
dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		0.048	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES3: Flue gas for NO_x and SO_x reduction, Processing aid, an auxiliary agent in different processes

3.1. Title section

Structured Short Title	: Use at industrial sites, Flue gas for NO _x and SO _x reduction, Processing aid, an auxiliary agent in different processes; Adhesives, sealants (PC1).; Coatings and paints, thinners, paint removers (PC9a).; Metal surface treatment products (PC14).; Non-metal surface treatment products (PC15).; Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20).; Paper and board treatment products (PC26).; Pharmaceuticals (PC29).; Photo-chemicals (PC30).; Textile dyes and impregnating products (PC34).; Washing and cleaning products (PC35).; Water treatment chemicals (PC37).; Cosmetics, personal care products (PC39).; Extraction agents (PC40).
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Environment		
CS1	Flue gas for NO _x and SO _x reduction, Processing aid, an auxiliary agent in different processes	ERC6b
Worker		
CS2	Use in closed process, no likelihood of exposure	PROC1
CS3	Use in closed, continuous process with occasional controlled exposure	PROC2
CS4	Use in closed batch process (synthesis or formulation)	PROC3
CS5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS8	Use as laboratory reagent	PROC15

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use of reactive processing aid at industrial site (no inclusion into or onto article) (ERC6b)

Amount used, frequency and duration of use (or from service life)

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Annual amount per site	: 1000 tonnes/year
Daily amount per site	: 10 tonnes/day
Emission days	: 365
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure
Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

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Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation)
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

3.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises
Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics
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Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers use up to 4 h
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 80 %	
Respiratory protection Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

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3.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 80 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.8. Control of worker exposure: Use as laboratory reagent

Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	

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Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Use of reactive processing aid at industrial site (no inclusion into or onto article) (ERC6b)

Release route	Release rate	Release estimation method
Water	0 %	spERC -6b – NH4
Air	0.001 %	spERC -6b – NH4
Soil	0 %	spERC -6b – NH4

Compartment	Exposure level	RCR
Freshwater	0.0015 µg/L (EUSES v2.1)	< 0.01
Marine water	0.00015 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.00012 µg/kg dry weight (EUSES v2.1)	< 0.01

3.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	0.0043 mg/m ³ (EASY TRA v5.2.0)	< 0.01	
dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		< 0.01	

3.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
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inhalative	systemic	long-term	10.64 mg/m ³ (EASY TRA v5.2.0)	0.224	
dermal	systemic	long-term	0.823 mg/kg bw/day (EASY TRA v5.2.0)	0.121	
combined routes	systemic	long-term		0.345	

3.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³ (EASY TRA v5.2.0)	0.188	
dermal	systemic	long-term	0.247 mg/kg bw/day (EASY TRA v5.2.0)	0.036	
combined routes	systemic	long-term		0.224	

3.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	4.258 mg/m ³ (EASY TRA v5.2.0)	0.089	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.102	

3.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.682 mg/m ³ (EASY TRA v5.2.0)	0.056	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.202	

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3.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (solid) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.516 mg/m ³ (EASY TRA v5.2.0)	0.179	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.191	

3.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	2.129 mg/m ³ (EASY TRA v5.2.0)	0.045	
dermal	systemic	long-term	0.021 mg/kg bw/day (EASY TRA v5.2.0)	< 0.01	
combined routes	systemic	long-term		0.048	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES4: Processing aid, Use in water treatment agents

4.1. Title section

Structured Short Title	: Widespread use by professional workers, Processing aid; Coatings and paints, thinners, paint removers (PC9a); Fertilizers (PC12); Metal surface treatment products (PC14); Non-metal surface treatment products (PC15); Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents (PC20); Laboratory chemicals (PC21); Pharmaceuticals (PC29); Textile dyes and impregnating products (PC34); Washing and cleaning products (PC35); Water treatment chemicals (PC37); Extraction agents (PC40).
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Environment		
CS1	Processing aid, pH regulating agent, Use in water treatment agents	ERC8b, ERC8e
Worker		
CS2	Use in closed, continuous process with occasional controlled exposure	PROC2
CS3	Use in closed batch process (synthesis or formulation)	PROC3
CS4	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS5	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS8	Roller application or brushing	PROC10
CS9	Non industrial spraying	PROC11
CS10	Treatment of articles by dipping and pouring	PROC13
CS11	Hand-mixing with intimate contact and only PPE available	PROC19

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

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Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 25000 tonnes/year
Daily amount per site	: 85 kg/day
Emission days	: 365
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

4.2.2. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure

Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers exposure up to 4 hrs
Technical and organisational conditions and measures	
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	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.3. Control of worker exposure: Use in closed batch process (synthesis or formulation)

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Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises
Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	

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Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

4.2.5. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Physical form of product : Liquid

Amount used, frequency and duration of use (or from service life)

Duration : Covers exposure up to 4 hrs

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

Use eye protection according to EN 166.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 80 %

Respiratory protection
Inhalation - minimum efficiency of 90 %

Other conditions affecting workers exposure

Indoor or outdoor use : Outdoor use

4.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Physical form of product : Liquid

Amount used, frequency and duration of use (or from service life)

Duration : Covers exposure up to 4 hrs

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

Use eye protection according to EN 166.

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 80 %

Respiratory protection

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Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Outdoor use

4.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics
Covers percentage substance in the product up to 25 %.
Physical form of product : Liquid
Amount used, frequency and duration of use (or from service life)
Duration : Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation
Use eye protection according to EN 166.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 80 %
Respiratory protection
Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Outdoor use

4.2.8. Control of worker exposure: Roller application or brushing

Roller application or brushing (PROC10)

Product (article) characteristics
Covers percentage substance in the product up to 25 %.
Physical form of product : Liquid
Amount used, frequency and duration of use (or from service life)
Duration : Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation
Use eye protection according to EN 166.
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 90 %

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Respiratory protection Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Outdoor use

4.2.9. Control of worker exposure: Non industrial spraying Non-industrial spraying (PROC11)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 80 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	
Dermal - minimum efficiency of 90 %	
Respiratory protection Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.10. Control of worker exposure: Treatment of articles by dipping and pouring Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used, frequency and duration of use (or from service life)	
Duration	: Covers daily exposures up to 8 hours

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Conditions and measures related to personal protection, hygiene and health evaluation		
Use eye protection according to EN 166.		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Dermal - minimum efficiency of 80 %		
Respiratory protection		
Inhalation - minimum efficiency of 90 %		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Outdoor use

4.2.11. Control of worker exposure: Hand-mixing with intimate contact and only PPE available Manual activities involving hand contact (PROC19)

Product (article) characteristics		
Covers percentage substance in the product up to 25 %.		
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers exposure up to 4 hrs
Conditions and measures related to personal protection, hygiene and health evaluation		
Use eye protection according to EN 166.		
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.		
Dermal - minimum efficiency of 90 %		
Respiratory protection		
Inhalation - minimum efficiency of 90 %		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Outdoor use

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

Release route	Release rate	Release estimation method
Water	2 %	Environmental Release Category (ERC)
Air	0.1 %	Environmental Release Category

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		(ERC)
Soil	0 %	Environmental Release Category (ERC)

Compartment	Exposure level	RCR
Freshwater	1.35 µg/L (EUSES v2.1)	< 0.01
Marine water	1.35 µg/L (EUSES v2.1)	0.16
Agricultural soil	22.1 µg/kg dry weight (EUSES v2.1)	0.01

4.3.2. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	12.77 mg/m ³ (EASY TRA v5.2.0)	0.268	
dermal	systemic	long-term	0.494 mg/kg bw/day (EASY TRA v5.2.0)	0.073	
combined routes	systemic	long-term		0.341	

4.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.516 mg/m ³ (EASY TRA v5.2.0)	0.179	
dermal	systemic	long-term	0.082 mg/kg bw/day (EASY TRA v5.2.0)	0.012	
combined routes	systemic	long-term		0.191	

4.3.4. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	11.97 mg/m ³ (EASY TRA v5.2.0)	0.251	

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dermal	systemic	long-term	0.823 mg/kg bw/day (EASY TRA v5.2.0)	0.121	
combined routes	systemic	long-term		0.373	

4.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³ (EASY TRA v5.2.0)	0.188	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.333	

4.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	4.471 mg/m ³ (EASY TRA v5.2.0)	0.094	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.239	

4.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	4.471 mg/m ³ (EASY TRA v5.2.0)	0.094	
dermal	systemic	long-term	0.494 mg/kg bw/day (EASY TRA v5.2.0)	0.073	
combined routes	systemic	long-term		0.167	

4.3.8. Worker exposure: Roller application or brushing (PROC10)

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Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³ (EASY TRA v5.2.0)	0.188	
dermal	systemic	long-term	0.987 mg/kg bw/day (EASY TRA v5.2.0)	0.145	
combined routes	systemic	long-term		0.333	

4.3.9. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.516 mg/m ³ (EASY TRA v5.2.0)	0.179	
dermal	systemic	long-term	1.286 mg/kg bw/day (EASY TRA v5.2.0)	0.189	
combined routes	systemic	long-term		0.368	

4.3.10. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	7.451 mg/m ³ (EASY TRA v5.2.0)	0.157	
dermal	systemic	long-term	1.646 mg/kg bw/day (EASY TRA v5.2.0)	0.242	
combined routes	systemic	long-term		0.399	

4.3.11. Worker exposure: Manual activities involving hand contact (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	8.941 mg/m ³ (EASY TRA v5.2.0)	0.188	
dermal	systemic	long-term	5.091 mg/kg bw/day (EASY TRA v5.2.0)	0.749	
combined routes	systemic	long-term		0.937	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES5: Use in coatings

5.1. Title section

Structured Short Title	: Consumer use, Use in coatings; Coatings and paints, thinners, paint removers (PC9a).
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Environment		
CS1	Use in coatings	ERC8b, ERC8e
Consumer		
CS2	Use in coatings	PC9a

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 1 tonnes/year
Daily amount per site	: 0.055 tonnes/day
Emission days	: 365
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

**5.2.2. Control of consumer exposure: Use in coatings
Coatings and paints, thinners, paint removers (PC9a)**

Product (article) characteristics
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Covers concentrations up to 0.05 %	
Amount used, frequency and duration of use (or from service life)	
For each use event, covers use amounts up to	: 0.1 kg
Duration	: Duration of the activity 15 min
Use frequency	: Use frequency 1 times / month
Other conditions affecting consumers exposure	
Room size	: Covers use in room size of 20 m ³
Ventilation rate	: 0.6

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

Release route	Release rate	Release estimation method
Water	2 %	Environmental Release Category (ERC)
Air	0.1 %	Environmental Release Category (ERC)
Soil	1 %	Environmental Release Category (ERC)

Compartment	Exposure level	RCR
Freshwater	0.0001 µg/L (EUSES v2.1)	< 0.01
Marine water	0.00001 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.000007 µg/kg dry weight (EUSES v2.1)	< 0.01

5.3.2. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	0.108 mg/m ³ (Consexpo v4.1)	< 0.01	
dermal	systemic	long-term	0.00096 mg/kg bw/day (Consexpo	< 0.01	

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			v4.1)		
oral	systemic	long-term	0.0029 mg/kg bw/day (Consexpo v4.1)	< 0.01	
combined routes	systemic	long-term		< 0.01	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES6: Use in cleaning agents

6.1. Title section

Structured Short Title	: Consumer use, Use in cleaning agents; Washing and cleaning products (PC35).
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Environment		
CS1	Use in cleaning agents	ERC8b, ERC8e
Consumer		
CS2	Use in cleaning agents	PC35

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 1 tonnes/year
Daily amount per site	: 0.055 tonnes/day
Emission days	: 365
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

**6.2.2. Control of consumer exposure: Use in cleaning agents
Washing and cleaning products (PC35)**

Product (article) characteristics
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Covers concentrations up to 0.12 %	
Amount used, frequency and duration of use (or from service life)	
For each use event, covers use amounts up to	: 0.05 kg
Other conditions affecting consumers exposure	
Room size	: 10 m ³
Ventilation rate	: 2

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b) / Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) (ERC8e)

Release route	Release rate	Release estimation method
Water	2 %	Environmental Release Category (ERC)
Air	0.1 %	Environmental Release Category (ERC)
Soil	1 %	Environmental Release Category (ERC)

Compartment	Exposure level	RCR
Freshwater	0.0001 µg/L (EUSES v2.1)	< 0.01
Marine water	0.00001 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.000007 µg/kg dry weight (EUSES v2.1)	< 0.01

6.3.2. Consumer exposure: Washing and cleaning products (PC35)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	short-term	0.676 mg/m ³ (Consexpo v4.1)	0.028	
dermal	systemic	short-term	0.223 mg/kg bw/day (Consexpo v4.1)	0.033	
combined routes	systemic	short-term		0.061	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

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ES7: Uses in cosmetics/personal care products, perfumes and fragrances

7.1. Title section

Structured Short Title	: Consumer use, Uses in cosmetics/personal care products, perfumes and fragrances; Cosmetics, personal care products (PC39).
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Environment		
CS1	Uses in cosmetics/personal care products, perfumes and fragrances	ERC8b
Consumer		
CS2	Uses in cosmetics/personal care products, perfumes and fragrances	PC39

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b)

Amount used, frequency and duration of use (or from service life)	
Annual amount per site	: 1 tonnes/year
Daily amount per site	: 0.055 tonnes/day
Emission days	: 365
STP type	: Municipal Sewage Treatment Plant
Additional information on STP	: Biological elimination
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2,000 m³/d
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18,000 m³/d
Local freshwater dilution factor	: 10

7.2.2. Control of consumer exposure: Uses in cosmetics/personal care products, perfumes and fragrances

Cosmetics, personal care products (PC39)

Product (article) characteristics
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Covers concentrations up to 4 %	
Amount used, frequency and duration of use (or from service life)	
Amounts used	: 0.1 kg
Use frequency	: 12 times per year
Other conditions affecting consumers exposure	
Room size	: 10 m ³
Ventilation rate	: 2

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) (ERC8b)

Release route	Release rate	Release estimation method
Water	2 %	Environmental Release Category (ERC)
Air	0.1 %	Environmental Release Category (ERC)
Soil	0 %	Environmental Release Category (ERC)

Compartment	Exposure level	RCR
Freshwater	0.0001 µg/L (EUSES v2.1)	< 0.01
Marine water	0.00001 µg/L (EUSES v2.1)	< 0.01
Agricultural soil	0.000007 µg/kg dry weight (EUSES v2.1)	< 0.01

7.3.2. Consumer exposure: Cosmetics, personal care products (PC39)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR	Remarks
inhalative	systemic	long-term	0.096 mg/m ³ (Consexpo v4.1)	< 0.01	
dermal	systemic	short-term	1.587 mg/kg bw/day (Consexpo v4.1)	0.233	

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.