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

1.1. Product identifier

Trade name	Anhydrous ammonia
Chemical description	Anhydrous ammonia
CAS N°	7664-41-7
CE N°	231-635-3
Index N°	007-001-00-5
Registration n°	01-2119488876-14
Chemical formula	NH ₃

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


Relevant identified uses	Industrial and professional See the list of identified uses and exposure scenarios in the annex of the safety data sheet Contact supplier for more information on uses
Uses advised against	Consumer use not recommended

1.3. Details of the supplier of the safety data sheet

Company identification	MULTIGAS Route de l'Industrie 102 CH-1564 Domdidier
Phone number	+41 (0) 26 676 94 94
E-mail address	info@multigas.ch

1.4. Emergency telephone numbers

Switzerland	145 (Toxicology Centre Zurich) or +41 (0) 44 251 51 51 +41 (0) 26 676 94 94 (Multigas)
Italy	112, 115, 118 Toxicology Centre 02 6610 1029 +41 (0) 26 676 94 94 (Multigas)
Belgium	112 Toxicology Centre 070 245 245 +41 (0) 26 676 94 94 (Multigas)
France	112 Toxicology Centres - Angers : 02 41 48 21 21 - Bordeaux : 05 56 96 40 80 - Lille : 0800 59 59 59 (Freephone number)

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- Lyon : 04 72 11 69 11
 - Marseille : 04 91 75 25 25
 - Nancy : 03 83 32 36 36
 - Paris : 01 40 05 48 48
 - Rennes : 02 99 59 22 22
 - Strasbourg : 03 88 37 37 37
 - Toulouse : 05 61 77 74 47
 +41 (0) 26 676 94 94 (Multigas)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Flammable gases, Category 2	H221
	Gases under pressure : Liquefied gas	H280
Health hazards	Skin corrosion/irritation, Category 1B	H314
	Acute toxicity (inhalation: gas) Category 3	H331
Environmental hazards	Hazardous to the aquatic environment — Acute Hazard, Category 1	H400
	Hazardous to the aquatic environment — Chronic Hazard, Category 2	H410

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms



GHS04

GHS05

GHS06


GHS09

Signal word

Danger

Hazard statements

H221	Flammable gas
H280	Contains gas under pressure; may explode if heated
H314	Causes severe skin burns and eye damage
H331	Toxic if inhaled
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects
EUH071	Corrosive to the respiratory tract

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Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P260	Do not breathe gas, vapours
P273	Avoid release to the environment
P280	Wear protective gloves, protective clothing, eye protection, face protection
P303+P361+P353+P315	IF ON SKIN: (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention
P305+P351+P338+P315	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	In case of leakage, eliminate all ignition sources
P410+P403	Protect from sunlight. Store in a well-ventilated place
P405	Store locked up

2.3. Other hazards

Liquid contact with boiling may cause frostbite or freezing of the skin

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Concentration	Classification
Anhydrous ammonia	(CAS-No.) 7664-41-7 (EC-No.) 231-635-3 (EC Index-No.) 007-001-00-5 (Registration-No.) 01-2119488876-14	<= 100%	Flam. Gas 2, H221 Press. Gas (Liq.), H280 Acute Tox. 3 (Inhalation: gas), H331 Skin Corr. 1B, H314 Eye Dam. 1, H318 Aquatic Acute 1, H400 Aquatic Chronic 2, H411

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

Contains no other components or impurities which will influence the classification of the product

3.2. Mixtures

Not established

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SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	See a doctor. Show this safety data sheet to the attending physician
In case of inhalation	In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor
In case of skin contact	Remove contaminated clothing and shoes immediately. Wash with soap and plenty of water. Take victim immediately to hospital. See a doctor
In case of eyes contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a doctor
In case of ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. See a doctor

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

The main known symptoms and effects are described on the labelling (see section 2.2) and / or section 11

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

Causes severe skin burns and eye damage. Contact with the liquefied gas can cause injury (frostbite) due to rapid cooling by evaporation. May be fatal if inhaled

Thaw the frozen parts with lukewarm water. Do not rub the affected areas. Seek immediate medical attention. Treat with a corticosteroid spray as soon as possible after inhalation

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Water spray or water mist. Dry powder. Foam
Unsuitable extinguishing media	Carbone dioxide Do not use water jet to extinguish

5.2. Special hazards arising from the substance or mixture

Specific hazards	In case of fire or excessive heat, hazardous combustion products may be produced Exposure to fire may cause containers to rupture/explode
Hazardous combustion products	In case of fire or excessive heat, hazardous combustion products may be produced such as : Nitric oxide/nitrogen dioxide

5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, spray mists or gases
 Provide adequate ventilation
 Remove all sources of ignition
 Evacuate the staff to a safe place
 Beware of vapours that accumulate forming explosive concentrations
 Vapours may accumulate in low areas
 Personal protective equipment, see section 8

6.2. Environmental precautions

Avoid further spills or leaks, if it is safely possible

6.3. Methods and material for containment and cleaning up

Ventilate the area
 Keep the area clear of all sources of ignition until all spilled liquid has evaporated (frost-free soil)

6.4. Reference to other sections

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling


Avoid contact with skin and eyes
 Avoid breathing vapour or mist
 Keep away from sources of ignition - No smoking
 Take measures to prevent the accumulation of electrostatic charges
 For precautions, see section 2.2

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place
 Content under pressure

7.3. Specific end use(s)

None

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Components with occupational exposure limits

Component	CAS N°	Exposure value type	Control parameter	Source
Switzerland				
Anhydrous ammonia	7664-41-7	TWA	20 ppm	SUVA: Occupational Exposure Limit Values (2017)
			14 mg/m ³	
		OEL	40 ppm	SUVA: Occupational Exposure Limit Values (2017)
			28 mg/m ³	
European Union				
Anhydrous ammonia	7664-41-7	TWA	20 ppm	EU. Indicative exposure values of Directives 91/322 / EEC, 2000/39 / EC, 2006/15 / EC, 2009/161 / EU (12 2009)
			14 mg/m ³	
		OEL	50 ppm	EU. Indicative exposure values of Directives 91/322 / EEC, 2000/39 / EC, 2006/15 / EC, 2009/161 / EU (12 2009)
			36 mg/m ³	

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation
 Gas detectors should be used when flammable / toxic gases / vapours are likely to be released

8.2.2. Individual protection measures, e.g. personal protective equipment

Eye/face protection

Safety glasses with full protection. Screen protection (20 cm minimum)
 Use eye protection equipment that has been tested and approved in accordance with applicable government standards, such as NIOSH (US) or EN 166 (EU)

Skin / hand protection


Wear protective gloves when handling gas cylinders - Standard EN 388-
 Protective gloves against mechanical hazards
 The selected protective gloves have to satisfy the specifications of EU Directive 89/686 / EEC and the standard EN 374 derived from it

Full contact

Material: butyl-rubber
 Minimum layer thickness: 0,3 mm
 Break through time: 480 min

Splash contact

Material: butyl-rubber
 Minimum layer thickness: 0,3 mm
 Break through time: 480 min

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Respiratory protection Have appropriate, chemical-resistant protective clothing ready for use in emergencies

Self-contained breathing apparatus (SCBA) or positive pressure air mask must be used in oxygenated atmospheres. Standard EN 137 - Self-contained compressed air device with a full face mask


8.2.3. Environmental exposure controls

Refer to local regulations for emission restrictions in the atmosphere. See Section 13 for methods specific to the treatment of waste gas

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
• Physical state at 20°C / 101.3kPa	Gas
• Colour	Colourless
Odour	Ammoniacal
Odour threshold	Data not available
pH	Data not available
Melting point / Freezing point	-77.7°C
Boiling point	-33°C
Flash point	132°C (Closed cup)
Evaporation rate	Data not available
Flammability (solid, gas)	Flammable gas
Explosive limits	15.4 - 33.6 vol %
Vapour pressure [20°C]	8.6 bar(a)
Vapour pressure [50°C]	20 bar(a)
Vapour density	Data not available
Relative density, liquid (water=1)	0.8
Relative density, gas (air=1)	0.6
Water solubility	517 g/l
Partition coefficient n-octanol/water (Log Kow)	Data not available
Auto-ignition temperature	630 °C
Decomposition temperature	Data not available
Viscosity	Data not available
Explosive properties	Data not available
Oxidising properties	Data not available

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9.2. Other information

Molar mass	17 g/mol
Critical temperature [°C]	132 °C
Relative vapour density	0.6 (Air=1)

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below

10.2. Chemical stability

Stable under the recommended storage conditions

10.3. Possibility of hazardous reactions

Can form explosive mixture with air
May react violently with oxidants

10.4. Conditions to avoid

Keep away from heat / sparks / open flames / hot surfaces

10.5. Incompatible materials

Oxidants, Iron, Zinc, Copper, Silver / Silver Oxides, Cadmium / Cadmium Oxides, Alcohols, Acids, Halogens, Aldehydes
For additional information on compatibility refer to ISO 11114

10.6. Hazardous decomposition products

Hazardous decomposition products are formed under fire conditions. - Nitrogen oxides (NO_x)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	Toxic if inhaled Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudo membrane formation
Skin corrosion/irritation	Causes severe skin burns and eye damage
Serious eye damage/irritation	Causes serious eye damage
Respiratory or skin sensitisation	Data not available
Germ cell mutagenicity	Data not available
Carcinogenicity	Data not available

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Reproductive toxicity	Data not available
STOT-single exposure – Target organ(s)	Severe corrosion to the respiratory tract at high concentrations May cause inflammation of the respiratory system Respiratory tract
STOT-repeated exposure	Data not available
Ingestion hazard	Data not available

SECTION 12: Ecological information

12.1. Toxicity

Assessment	Very toxic to aquatic life. Toxic to aquatic life with long lasting effects
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12.2. Persistence and degradability

The substance is readily biodegradable. Unlikely to persist

12.3. Bioaccumulative potential

Data not available

12.4. Mobility in soil

Data not available

12.5. Results of PBT and vPvB assessment

PBT / vPvB assessment is not available because the chemical safety assessment is not required / is not conducted


12.6. Other adverse effects

Very toxic to aquatic life with long lasting effects

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	Must not be released into the atmosphere Burn in a chemical incinerator equipped with an afterburner and scrubber Return to the supplier the product not consumed in its original container
Contaminated container	Eliminate as unused product Contact the supplier if instructions are needed
OMoD Code	16 05 04 Gases in pressure containers containing dangerous substances

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SECTION 14: Transport information

14.1. UN number

Transport by road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
1005	1005	1005

14.2. UN proper shipping name

Transport by road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
Ammonia, anhydrous	Ammonia, anhydrous	Ammonia, anhydrous

14.3. Transport hazard class(es)

Labelling



ADR/RID
IMDG
IATA

2.3 (8)
Toxic gases (Corrosive substances)

14.4. Packing group

ADR/RID
IMDG
IATA

Not established

14.5. Environmental hazards

ADR/RID

Environmentally hazardous substance / mixture

IMDG

Marine pollutant

ICAO-TI / IATA-DGR

Environmentally hazardous substance / mixture

14.6. Special precautions for user

Data not available

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

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This safety data sheet complies with the requirements of Regulation (CE) No. 1907/2006

15.2. Chemical safety assessment

A CSA has been carried out


SECTION 16: Other information

Indication of changes	Revised safety data sheet in accordance with commission regulation (EU) No 2015/830
Abbreviations and acronyms	<p>ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road</p> <p>CAS : Chemical Abstract Service number (USA)</p> <p>CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008</p> <p>CSA : Chemical Safety Assessment</p> <p>EIGA : European Industrial Gases Association</p> <p>EINECS : European Inventory of Existing Commercial Chemical Substances</p> <p>EN : European Standard</p> <p>ATE : Acute Toxicity Estimate</p> <p>IATA : International Air Transport Association</p> <p>IMDG Code : International Maritime Dangerous Goods Code</p> <p>LC50 : Lethal Concentration to 50 % of a test population</p> <p>OMoD : Swiss Ordinance on the movement of waste</p> <p>PBT : Persistent, Bioaccumulative and Toxic</p> <p>PPE: Personal Protection Equipment</p> <p>REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006</p> <p>RID : Regulations concerning the international carriage of dangerous goods by rail</p> <p>RMM : Risk Management Measures</p> <p>STOT-SE : Specific Target Organ Toxicity - Single Exposure</p> <p>UN : United Nations</p> <p>vPvB : Very Persistent and Very Bioaccumulative</p> <p>WGK: Water Hazards Class</p>

Full text of H, EUH and P statements used in sections 2 and 3

Hazard statements

H221	Flammable gas
H280	Contains gas under pressure; may explode if heated
H314	Causes severe skin burns and eye damage
H331	Toxic if inhaled

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H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects
EUH071	Corrosive to the respiratory tract

Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P260	Do not breathe gas, vapours
P273	Avoid release to the environment
P280	Wear protective gloves, protective clothing, eye protection, face protection
P303+P361+P353+P315	IF ON SKIN: (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention
P305+P351+P338+P315	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	In case of leakage, eliminate all ignition sources
P410+P403	Protect from sunlight. Store in a well-ventilated place
P405	Store locked up

Disclaimer of liability

Details given in this document have been prepared based on the most available reliable documents and are believed to be correct at the time of going to press
They do not claim to be exhaustive and should be considered as a guide

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1 IDENTIFIED USES

1.1 Usage: Production

Main user groups

SU3	Uses of substances as such or in preparations at industrial sites
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals
SU20	Health services

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Categories of release into the environment

ERC1	Manufacture of the substance
------	------------------------------

1.2 Use in / as formulation

Main user groups

SU1	Agriculture, forestry, fishery
SU2	Mining
SU3	Uses of substances as such or in preparations at industrial sites
SU10	Formulation
SU24	Scientific research and development

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

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- PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
- PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
- PROC15 Use as laboratory reagent

Categories of release into the environment

- ERC2 Formulation into mixture

1.3 Use in / as formulation, Industrial applications, Professional applications

Main user groups


- SU1 Agriculture, forestry, fishery
- SU3 Uses of substances as such or in preparations at industrial sites
- SU5 Manufacture of textiles, leather, fur
- SU8 Manufacture of bulk, large scale chemicals (including petroleum products)
- SU9 Manufacture of fine chemicals
- SU15 Manufacture of fabricated metal products, except machinery and equipment
- SU20 Health services
- SU24 Scientific research and development

Process categories

- PROC1 Chemical production or refinery in closed process without likelihood of exposure
- PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure
- PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
- PROC4 Chemical production where opportunity for exposure arises
- PROC5 Mixing or blending in batch processes
- PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
- PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
- PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
- PROC15 Use as laboratory reagent

Categories of release into the environment

- ERC6a Use of intermediate

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1.4 Use in / as formulation, Industrial applications, Professional applications

Main user groups

SU3	Uses of substances as such or in preparations at industrial sites
SU4	Manufacture of food products
SU5	Manufacture of textiles, leather, fur
SU6	Manufacture of wood and wood products
SU7	Printing and reproduction of recorded media
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU11	Manufacture of rubber products
SU12	Manufacture of plastics products, including compounding and conversion
SU13	Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU15	Manufacture of fabricated metal products, except machinery and equipment
SU16	Manufacture of computer, electronic and optical products, electrical equipment
SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
SU22	Professional uses
SU23	Electricity, steam, gas water supply and sewage treatment

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC15	Use as laboratory reagent
PROC19	Manual activities involving hand contact

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Categories of release into the environment

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7	Use of functional fluid at industrial site

1.5 Use in / as formulation, Industrial applications, Professional applications

Main user groups

SU1	Agriculture, forestry, fishery
SU10	Formulation
SU22	Professional uses
SU23	Electricity, steam, gas water supply and sewage treatment

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC15:	Use as laboratory reagent
PROC18	General greasing /lubrication at high kinetic energy conditions
PROC19	Manual activities involving hand contact

Categories of release into the environment

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
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ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

1.6 Consumer use, use generating wide dispersion, (<25% Aqueous solution)

Main user groups


SU21	Uses by consumers: Private households (= general public = consumers)
------	--

Categories of chemicals

PC1	Adhesives, sealants
PC9a	Coatings and paints, thinners, paint removers
PC9b	Fillers, putties, plasters, modelling clay
PC9c	Finger paints
PC12	Fertilizers
PC16	Heat transfer fluids
PC18	Ink and toners
PC20	Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
PC23	Leather treatment products
PC35	Washing and cleaning products
PC37	Water treatment chemicals
PC39	Cosmetics, personal care products

Categories of release into the environment

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

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ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

2 Exposure scenarii

2.1 Production

Main user groups

SU3	Uses of substances as such or in preparations at industrial sites
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals
SU20	Health services

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Categories of release into the environment

ERC1	Manufacture of the substance
------	------------------------------

2.1.1 Scenario contributing to environmental exposure control for ERC1: Substance production

Quantity used

Annual quantity per site <2'000 tonne(s)/year


Other given operating conditions affecting the exposure of the environment

Number of emission days per year 330

Emission in the air 36,1 mg/m³

Technical conditions and measures / Organizational measures

Remarks On site pre-treatment plant is required. Efficiency (~ 100%) of the ammonia treatment plant by nitrification to nitrate followed by denitrification resulting in the emission of nitrogen gas., Sludge from the on-site treatment of the effluent, Can be dumped or incinerated, if local regulations permit

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2.1.2 Contribution scenario for controlling workers' exposure for general measures PROC1, PROC2, PROC8a, PROC8b:

**Chemical production or refinery in closed process without likelihood of exposure,
 Chemical production or refinery in closed continuous process with occasional controlled exposure,
 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
 Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Product features

Concentration of the substance in the mixture / article Covers concentrations up to 100 %.

Physical Form (at time of use) Gaseous

Frequency and duration of use

Frequency of use 220 days/ year

Remarks Covers daily exposures up to 12 hours (unless specified otherwise)

Human factors that are not influenced by risk management

Skin exposure Palms of both hands (480 cm²)

Respiratory volume 20 m³/day

Technical conditions and measures

Provide a good level of general or controlled ventilation. Handle the substance inside a closed system. Automated activity to the extent possible

Organizational measures to prevent / limit releases, dispersions, and exposures

Ensure that employees are trained to minimize exposures as much as possible., Inspect, test and regularly maintain all control measures

Conditions and measures related to the assessment of personal protection, hygiene and health

Where there is a risk of exposure: Wear personal protective equipment

2.1.3 Scenario of contribution to controlling worker exposure for PROC1:

Chemical production or refinery in closed process without likelihood of exposure

Remarks See 2.1.2 "Contributing scenario controlling worker exposure for: General measures"

2.1.4 Contributing scenario for controlling worker exposure for PROC2:

Chemical production or refinery in closed continuous process with occasional controlled exposure

Technical conditions and measures

Sample through a closed loop or other system to avoid exposure. Ensure that samples are obtained under confinement or with extraction ventilation. Isolate activity from other operations

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**2.1.5 Contributing scenario to control worker exposure for PROC8a:
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation.

**2.1.6 Contributing scenario to control worker exposure for PROC8b:
Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation.

2.1.7 Exposure estimation and reference of its source

Environment

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Compartment	Type of value	Exposure level	RCR
ERC1	EUSES	Free ammonia	Fresh water		0,133µg/l	0,121
Remarks		LEV = Local ventilation RPE = Respiratory protective equipment				
		Free ammonia	Sea water		0,0315µg/l	0,029

Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PROC1	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
	ECETOC TRA	Exterior, systemic	Inhalation	< 0,01 mg/m ³	< 0,001
		Exterior, Acute effects - local, Chronic effects - local	Inhalation	< 0,01 mg/m ³	< 0,01
PROC2	ECETOC TRA	Exterior, systemic	Dermal	1,37 mg/kg pc/jour	0,02
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002
	ECETOC TRA	Exterior, systemic	Inhalation	< 24,79 mg/m ³	< 0,52
		Exterior, Acute effects - local	Inhalation	< 24,79 mg/m ³	< 0,69
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,24 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10

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		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25
PROC8a	ECETOC TRA	Interior with ventilation, long term, local	Inhalation	0.89 mg/m ³	0.06
		Interior with ventilation, long term, local	Inhalation	0.89 mg/m ³	0.06
		Interior with ventilation, long term, local	Dermal	0.14 mg/kg pc/jour	0.02
		Interior with ventilation, court term, local	Dermal	0.14 mg/kg pc/jour	0.02
PROC8b	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,08
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,10
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,27
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,19 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,19 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,19 mg/m ³	< 0,23

2.1.8 Advice to downstream user to evaluate whether he works within the boundaries set by the Exposure Scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks / operational conditions are adopted, the user must ensure that the risks are managed at least at an equivalent level

2.2 Use in / as formulation

Main user groups

SU1	Agriculture, forestry, fishery
SU2	Mining
SU3	Uses of substances as such or in preparations at industrial sites
SU10	Formulation
SU24	Scientific research and development

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Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Categories of release into the environment

ERC2	Formulation into mixture
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2.2.1 Scenario contributing to the control of the environmental exposure for ERC1: Manufacture of the substance

Quantity used

Annual quantity per site < 2'000 tonne(s)/year


Other given operating conditions affecting the exposure of the environment

Number of emission days per year 330

Emission in the air 19 mg/m³

Technical conditions and measures / Organizational measures

Remarks On site pre-treatment plant is required. Efficiency (~ 100%) of the ammonia treatment plant by nitrification nitrate followed by denitrification resulting in the emission of nitrogen gas. Sludge from on-site treatment of effluent : Can be disposed of in landfill or incinerated, if local regulations permit

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2.2.2 Scenario of contribution to controlling worker exposure for general measures PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15:

Chemical production or refinery in closed process without likelihood of exposure,
Chemical production or refinery in closed continuous process with occasional controlled exposure,
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,
Mixing or blending in batch processes,
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
Transfer of substance or mixture (charging and discharging) at dedicated facilities,
Transfer of substance or mixture into small containers (dedicated filling line, including weighing),
Use as laboratory reagent

Product features

Concentration of the substance in the mixture / article Covers concentrations up to 100 %.

Physical form (at the time of use) Gaseous

Frequency and duration of use

Frequency of use 220 days/year

Remarks Covers daily exposures up to 12 hours (unless specified otherwise)

Human factors that are not influenced by risk management

Exposure through the skin Palms of both hands (480 cm²)

Respiratory volume 20 m³/day

Technical conditions and measures

Provide a good level of general or controlled ventilation. Handle the substance inside a closed system. Automated activity to the extent possible

Organizational measures to prevent / limit releases, dispersions, and exposures

Ensure that employees are trained to minimize exposures as much as possible. Inspect, test and regularly maintain all control measures


Conditions and measures related to the assessment of personal protection, hygiene and health

Where there is a risk of exposure :, Wear personal protective equipment

2.2.3 Contribution Scenario for Controlling Workers' Exposure for PROC1:

Chemical production or refinery in closed process without likelihood of exposure

Remarks See 2.2.2 "Scenario of contribution to controlling worker exposure for: General measures"

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2.2.4 Scenario of contribution to controlling worker exposure for PROC2:

Chemical production or refinery in closed continuous process with occasional controlled exposure

Technical conditions and measures Sample through a closed loop or other system to avoid exposure. Ensure that samples are obtained under confinement or with extraction ventilation. Isolate activity from other operations

2.2.5 Scenario of contribution to controlling worker exposure for PROC3:

Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure

Remarks See 2.2.2 "Scenario of contribution to controlling worker exposure for: General measures"

2.2.6 Scenario of contribution to controlling worker exposure for PROC5:

Mixing or blending in batch processes

Remarks See 2.2.2 "Scenario of contribution to controlling worker exposure for: General measures"

2.2.7 Scenario of contribution to controlling worker exposure for PROC8a, PROC8b:

**Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation

2.2.8 Scenario of contribution to controlling worker exposure for PROC9:

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

Technical conditions and measures Ensure material transfers are under containment or extract ventilation. Keep the container tightly closed

2.2.9 Scenario of contribution to controlling worker exposure for PROC15:

Use as laboratory reagent

Other operational conditions affecting worker exposure

Exterior / Interior Interior

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Technical conditions and measures Ensure a good level of general ventilation. Natural ventilation comes from doors, windows etc.
 Controlled ventilation means that there is a supply or withdrawal of air by an electric fan

2.2.10 Exposure estimation and reference of its source

Environment

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Compartment	Type of value	Exposure level	RCR
ERC1	EUSES	Ammoniac free	Fresh water		0,0497µg/l	0,045
Remarks:		LEV = Ventilation locale. RPE = Respiratory protection equipment.				
		Ammoniac free	Sea water		0,0120µg/l	0,011

Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PROC1	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
	ECETOC TRA	Exterior, systemic, Acute effects - local, Chronic effects - local	Inhalation	< 0,01 mg/m ³	< 0,01
PROC2	ECETOC TRA	Exterior, systemic	Dermal	1,37 mg/kg pc/jour	0,02
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002
	ECETOC TRA	Exterior, systemic	Inhalation	< 24,79 mg/m ³	< 0,52
		Exterior, Acute effects - local	Inhalation	< 24,79 mg/m ³	< 0,69
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,24 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25
PROC3	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001

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	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 7,08 mg/m ³	< 0,20
PROC5	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg pc/jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,07 mg/kg pc/jour	0,001
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC8a	ECETOC TRA	Exterior, systemic, Wearing gloves (90% efficiency)	Dermal	13,71 mg/kg pc/jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation	Inhalation	< 17,71 mg/m ³	< 0,37
PROC8b	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,08
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,10

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		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,27
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,19 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,19 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,19 mg/m ³	< 0,23
PROC9	ECETOC TRA	Exterior, Interior without ventilation with suction at the source	Dermal	6,86 mg/kg p.c./jour	0,101
		Interior with ventilation with suction at the source	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,10
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,14
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,35
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 14,17 mg/m ³	< 0,30
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 14,17 mg/m ³	< 0,39
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,71 mg/m ³	< 0,05
PROC15	ECETOC TRA	Interior without ventilation with suction at the source, Systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001
	ECETOC TRA	Interior without ventilation with suction at the source, Systemic	Inhalation	< 35,42 mg/m ³	< 0,74
		Interior without ventilation with suction at the source, Acute effects - local	Inhalation	< 35,42 mg/m ³	< 0,98
		Interior without ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,77 mg/m ³	< 0,13
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25

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2.2.11 Advise for the downstream user to evaluate if they are working within the boundaries defined by the exposure scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks are managed at least at an equivalent level

2.3 Use in / as formulation, industrial applications, professional applications

Main user groups


SU1	Agriculture, forestry, fishery
SU3	Uses of substances as such or in preparations at industrial sites
SU5	Manufacture of textiles, leather, fur
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals
SU15	Manufacture of fabricated metal products, except machinery and equipment
SU20	Health services
SU24	Scientific research and development

Process categories

PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Categories of release into the environment

ERC6a	Use of intermediate
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2.3.1 Environmental Exposure Control Contribution Scenario for ERC6a: Use of intermediate

Quantity used

Annual quantity per site < 2'000 tonne(s)/year

Other given operating conditions affecting the exposure of the environment

Number of emission days per year 330

Emission in the air 30.5 mg/m³

Technical conditions and measures / Organizational measures

Remarks On site pre-treatment plant is required. Efficiency (~ 100%) of the ammonia treatment plant by nitrification to nitrate followed by denitrification resulting in the emission of nitrogen gas., Sludge from the on-site treatment of the effluent, Can be dumped or incinerated, if local regulations permit

2.3.2 Scenario of contribution to controlling worker exposure for measures generals PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15:

Chemical production or refinery in closed process without likelihood of exposure,

Chemical production or refinery in closed continuous process with occasional controlled exposure,

Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,

Chemical production where opportunity for exposure arises,

Mixing or blending in batch processes,

Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,

Transfer of substance or mixture (charging and discharging) at dedicated facilities,

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

Use as laboratory reagent

Product features

Concentration of the substance in the mixture / article Covers concentrations up to 100 %.

Physical form (at the time of use) Liquefied gas

Frequency and duration of use


Frequency of use 220 days/ year

Remarks Covers daily exposures up to 12 hours (unless specified otherwise)

Human factors that are not influenced by risk management

Exposure through the skin Palms of both hands (480 cm²)

Respiratory volume 20 m³/day

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Technical conditions and measures

Provide a good level of general or controlled ventilation. Handle the substance inside a closed system. Automated activity to the extent possible

Organizational measures to prevent / limit releases, dispersions, and exposures

Ensure that employees are trained to reduce exposures as much as possible. Inspect, test and regularly maintain all control measures

Conditions and measures related to the assessment of personal protection, hygiene and health

Where there is a risk of exposure: Wear personal protective equipment

**2.3.3 Contribution Scenario for Controlling Workers' Exposure for PROC1:
Chemical production or refinery in closed process without likelihood of exposure**

Remarks

See 2.3.2 "Contributing scenario controlling worker exposure for: General measures"

**2.3.4 Contributing scenario for controlling worker exposure for PROC2:
Chemical production or refinery in closed continuous process with occasional controlled exposure**

Technical conditions and measures

Sample through a closed loop or other system to avoid exposure. Ensure that samples are obtained under confinement or with extraction ventilation. Isolate activity from other operations

**2.3.5 Scenario of contribution to controlling worker exposure for PROC3, PROC4:
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,
Chemical production where opportunity for exposure arises**

Remarks

See 2.3.2 «Contributing scenario controlling worker exposure for: General measures»

**2.3.6 Scenario of contribution to controlling worker exposure for PROC5:
Mixing or blending in batch processes**

Remarks

See 2.3.2 «Contributing scenario controlling worker exposure for: General measures»

**2.3.7 Scenario of contribution to controlling worker exposure for PROC8a, PROC8b:
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Technical conditions and measures

Ensure material transfers are under containment or extract ventilation

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2.3.8 Scenario of contribution to controlling worker exposure for PROC9:

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

Technical conditions and measures Ensure material transfers are under containment or extract ventilation
Keep the container tightly closed

2.3.9 Scenario of contribution to controlling worker exposure for PROC15:

Use as laboratory reagent

Other operational conditions affecting worker exposure

Exterior / Interior

Interior

Technical conditions and measures Ensure a good level of general ventilation. Natural ventilation comes from doors, windows etc.
Controlled ventilation means that there is a supply or withdrawal of air by an electric fan

2.3.10 Exposure estimation and reference of its source

Environment

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Compartment	Type of value	Exposure level	RCR
ERC1	EUSES	Ammoniac free	Fresh water		0,0837µg/l	0,076
Remarks:		LEV = local ventilation RPE = Respiratory protective equipment				
		Ammoniac free	Sea water		0,0205µg/l	0,019

Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PROC1	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
	ECETOC TRA	Exterior, systemic, Acute effects - local, Chronic effects - local	Inhalation	< 0,01 mg/m³	< 0,01
PROC2	ECETOC TRA	Exterior, systemic	Dermal	1,37 mg/kg pc/jour	0,02
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002

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	ECETOC TRA	Exterior, systemic	Inhalation	< 24,79 mg/m ³	< 0,52
		Exterior, Acute effects - local	Inhalation	< 24,79 mg/m ³	< 0,69
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,24 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25
PROC3	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, Effects acute	Inhalation	< 7,08 mg/m ³	< 0,20
PROC4	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
PROC3, PROC4	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 7,08 mg/m ³	< 0,20
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 7,08 mg/m ³	< 0,51
PROC5	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg pc/jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,07 mg/kg pc/jour	0,001

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	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC8a PROC8b	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,08
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,10
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,27
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,19 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,19 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,19 mg/m ³	< 0,23
PROC9	ECETOC TRA	Exterior, Interior sans Ventilation avec Aspiration à la Source	Dermal	6,86 mg/kg p.c./jour	0,101
		Interior with ventilation with suction at the source	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,10
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,14
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,35
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 14,17 mg/m ³	< 0,30
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 14,17 mg/m ³	< 0,39

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		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,71 mg/m ³	< 0,05
PROC15	ECETOC TRA	Interior sans Ventilation avec Aspiration à la Source, Systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001
	ECETOC TRA	Interior sans Ventilation avec Aspiration à la Source, Systemic	Inhalation	< 35,42 mg/m ³	< 0,74
		Interior without ventilation with suction at the source, Acute effects - local	Inhalation	< 35,42 mg/m ³	< 0,98
		Interior without ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,77 mg/m ³	< 0,13
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25

2.3.11 Advice to downstream user to evaluate whether he works within the boundaries set by the Exposure Scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks are managed at least at an equivalent level

2.4 Use in / as formulation, Industrial applications, Professional applications

Main user groups

SU3	Uses of substances as such or in preparations at industrial sites
SU4	Manufacture of food products
SU5	Manufacture of textiles, leather, fur
SU6	Manufacture of wood and wood products
SU7	Printing and reproduction of recorded media
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU11	Manufacture of rubber products
SU12	Manufacture of plastics products, including compounding and conversion
SU13	Manufacture of other non-metallic mineral products, e.g. plasters, cement

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SU15	Manufacture of fabricated metal products, except machinery and equipment
SU16	Manufacture of computer, electronic and optical products, electrical equipment
SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
SU22	Professional uses
SU23	Electricity, steam, gas water supply and sewage treatment

Process categories


PROC1	Chemical production or refinery in closed process without likelihood of exposure
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC7	Industrial spraying
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC15	Use as laboratory reagent
PROC19	Manual activities involving hand contact

Categories of release into the environment

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC5	Use at industrial site leading to inclusion into/onto article
ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7	Use of functional fluid at industrial site

2.4.1 Scenario contributing to the control of the environmental exposure for ERC4, ERC5, ERC6b, ERC7:

Use of non-reactive processing aid at industrial site (no inclusion into or onto article),
Use at industrial site leading to inclusion into/onto article,
Use of reactive processing aid at industrial site (no inclusion into or onto article)
Use of functional fluid at industrial site

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Quantity used

Annual quantity per site <2'000 tonne(s)/year

Other given operating conditions affecting the exposure of the environment

Number of emission days per year 330

Emission in the air (ERC4): 18 mg/m³

Emission in the air(ERC5): 9.45 mg/m³

Emission in the air(ERC6b): 0.0189 mg/m³

Emission in the air(ERC7): 0.945 mg/m³

Technical conditions and measures / Organizational measures

Remarks A pre-treatment plant wastewater on site is required. Efficiency (~ 100%) of the ammonia treatment plant by nitrification nitrate followed by denitrification resulting in the emission of nitrogen gas. Sludge from the on-site treatment of the effluent can be dumped or incinerated, if local regulations permit

2.4.2 Scenario of contribution to controlling worker exposure for general measures PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC19:

**Chemical production or refinery in closed process without likelihood of exposure,
Chemical production or refinery in closed continuous process with occasional controlled exposure,**

Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,

Chemical production where opportunity for exposure arises,

Mixing or blending in batch processes,

Industrial spraying,

Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,

Transfer of substance or mixture (charging and discharging) at dedicated facilities,

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

Roller application or brushing,

Treatment of articles by dipping and pouring

Use as laboratory reagent,

Manual activities involving hand contact

Product features


Concentration of the substance in the mixture / article Covers concentrations up to 100 %.

Physical form (at the time of use) Liquefied gas

Frequency and duration of use

Frequency of use 220 days/ year

Remarks Covers daily exposures up to 12 hours (unless specified otherwise)

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Human factors that are not influenced by risk management

Exposure through the skin Palms of both hands (480 cm²)

Respiratory volume 20 m³/jour

Technical conditions and measures

Provide a good level of general or controlled ventilation. Handle the substance inside a closed system. Automated activity to the extent possible

Organizational measures to prevent / limit releases, dispersions, and exposures

Ensure that employees are trained to reduce exposures as much as possible. Inspect, test and regularly maintain all control measures

Conditions and measures related to the assessment of personal protection, hygiene and health

Where there is a risk of exposure: Wear personal protective equipment

**2.4.3 Contribution Scenario for Controlling Workers' Exposure for PROC1:
Chemical production or refinery in closed process without likelihood of exposure**

Remarks See 2.4.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.4.4 Contributing scenario for controlling worker exposure for PROC2:
Chemical production or refinery in closed continuous process with occasional controlled exposure**

Technical conditions and measures Sample through a closed loop or other system to avoid exposure. Ensure that samples are obtained under confinement or with extraction ventilation. Isolate activity from other operations


**2.4.5 Scenario of contribution to controlling worker exposure for PROC3, PROC4:
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,
Chemical production where opportunity for exposure arises**

Remarks See 2.4.2 «Contributing scenario controlling worker exposure for: General measures»

**2.4.6 Scenario of contribution to controlling worker exposure for PROC5:
Mixing or blending in batch processes**

Remarks See 2.4.2 «Contributing scenario controlling worker exposure for: General measures»

**2.4.7 Scenario of contribution to controlling worker exposure for PROC7:
Industrial spraying**

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Remarks

See 2.4.2 «Contributing scenario controlling worker exposure for: General measures»

**2.4.8 Scenario of contribution to controlling worker exposure for PROC8a, PROC8b:
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation

**2.4.9 Scenario of contribution to controlling worker exposure for PROC9:
Transfer of substance or mixture into small containers (dedicated filling line, including weighing)**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation
Keep the container tightly closed

**2.4.10 Scenario of contribution to controlling worker exposure for PROC10:
Roller application or brushing**

Remarks

See 2.4.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.4.11 Scenario of contribution to controlling worker exposure for PROC13:
Treatment of articles by dipping and pouring**

Remarks

See 2.4.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.4.12 Scenario of contribution to controlling worker exposure for PROC15:
Use as laboratory reagent**

Remarks

See 2.4.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.4.13 Scenario of contribution to controlling worker exposure for PROC19:
Manual activities involving hand contact**

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Remarks

See 2.4.2 "Scenario of contribution to controlling worker exposure for: General measures"

2.4.14 Exposure estimation and reference of its source

Environment

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Compartment	Type of value	Exposure level	RCR
ERC4	EUSES	Ammoniac free	Fresh water		0,108µg/l	0,098
Remarks:		LEV = Local ventilation RPE = Respiratory protection equipment.				
		Ammoniac free	Sea water		0,0231µg/l	0,021
ERC5			Fresh water		0,0558µg/l	0,051
			Sea water		0,0121µg/l	0,011
ERC6b			Fresh water		0,0017µg/l	0,0016
			Sea water		0,0002µg/l	0,0002
ERC7			Fresh water		0,0056µg/l	0,0051
			Sea water		0,0012µg/l	0,0011

Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PROC1	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
	ECETOC TRA	Exterior, systemic, Acute effects - local, Chronic effects - local	Inhalation	< 0,01 mg/m ³	< 0,01
PROC2	ECETOC TRA	Exterior, systemic	Dermal	1,37 mg/kg pc/jour	0,02
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002
	ECETOC TRA	Exterior, systemic	Inhalation	< 24,79 mg/m ³	< 0,52
		Exterior, Acute effects - local	Inhalation	< 24,79 mg/m ³	< 0,69
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,24 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10

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		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25
PROC3	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, acute effects	Inhalation	< 7,08 mg/m ³	< 0,20
PROC4	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
PROC3, PROC4	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 7,08 mg/m ³	< 0,20
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 7,08 mg/m ³	< 0,51
PROC5	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg pc/jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,07 mg/kg pc/jour	0,001
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37

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		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC7	ECETOC TRA	Interior with ventilation with long exposure	Inhalation	1.09 mg/m ³	0.08
		Interior with ventilation with short term exposure	Inhalation	2.14 mg/m ³ pc/jour	0.32
PROC8a PROC8b	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,08
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,10
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,27
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,19 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,19 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,19 mg/m ³	< 0,23
PROC9	ECETOC TRA	Exterior, Interior sans Ventilation avec Aspiration à la Source	Dermal	6,86 mg/kg p.c./jour	0,101
		Interior with ventilation with suction at the source	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,10
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,14
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,35
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 14,17 mg/m ³	< 0,30
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 14,17 mg/m ³	< 0,39
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,71 mg/m ³	< 0,05
PROC10 PROC13	ECETOC TRA	Exterior, Interior sans Ventilation avec Aspiration à la Source	Dermal	13,71 mg/kg p.c./jour	0,202

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		Interior with ventilation with suction at the source	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	6,20 mg/m ³	0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	6,20 mg/m ³	0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	6,20 mg/m ³	0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	17,71 mg/m ³	0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	17,71 mg/m ³	0,49
		Interior with ventilation with suction at the source, Chronic effects-local, With RPE (95% efficiency)	Inhalation	0,89 mg/m ³	0,06
PROC15	ECETOC TRA	Interior with ventilation with long exposure	Inhalation	3.54 mg/m ³	0.25
		Interior with ventilation with short term exposure	Inhalation	3.54 mg/m ³	0.25
PROC19	ECETOC TRA	Interior with ventilation with long exposure	Inhalation	10.94 mg/m ³	0.78
		Interior with ventilation with long exposure	Dermal	1.41 mg/m ³	0.2
		Interior with ventilation with short term exposure	Inhalation	10.94 mg/m ³	0.78

2.4.15 Advice to downstream user to evaluate whether he works within the boundaries set by the Exposure Scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks are managed at least at an equivalent level

2.5 Use in / as formulation, Industrial applications, Professional applications
Main user groups

SU1	Agriculture, forestry, fishery
SU10	Formulation
SU22	Professional uses

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Process categories	SU23	Electricity, steam, gas water supply and sewage treatment
	PROC1	Chemical production or refinery in closed process without likelihood of exposure
	PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure
	PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure
	PROC4	Chemical production where opportunity for exposure arises
	PROC5	Mixing or blending in batch processes
	PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
	PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities
	PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
	PROC10	Roller application or brushing
	PROC11	Non industrial spraying
	PROC13	Treatment of articles by dipping and pouring
	PROC15:	Use as laboratory reagent
	PROC18	General greasing /lubrication at high kinetic energy conditions
	PROC19	Manual activities involving hand contact

Categories of release into the environment

ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b	Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC8e	Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

2.5.1 Scenario contributing to the control of the environmental exposure for ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f, ERC9a, ERC9b, ERC11a:

Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
Widespread use of reactive processing aid (no inclusion into or onto article, indoor)

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Widespread use leading to inclusion into/onto article (indoor)
Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
Widespread use leading to inclusion into/onto article (outdoor)
Widespread use of functional fluid (indoor)
Widespread use of functional fluid (outdoor)
Widespread use of articles with low release (indoor)

Technical conditions and measures / Organizational measures

Remarks The likelihood that workers, the public or the environment will be exposed to the substance under normal or reasonably foreseeable conditions of use is negligible. Closed systems are used to prevent unintentional emissions. Professional workers should be informed to prevent accidental release

Conditions and measures related to the municipal wastewater treatment plant


Remarks Small quantities emitted locally may be discharged into the treatment plant in which the purification is supposed to be effective given the biodegradable nature of the ammoniacal solutions of low concentration. Solutions with high pH must be neutralized before evacuation

2.5.2 Scenario of contribution to controlling worker exposure for general measures PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC18, PROC19:

Chemical production or refinery in closed process without likelihood of exposure,
Chemical production or refinery in closed continuous process with occasional controlled exposure,
Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure,
Chemical production where opportunity for exposure arises,
Mixing or blending in batch processes,
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities,
Transfer of substance or mixture (charging and discharging) at dedicated facilities,
Transfer of substance or mixture into small containers (dedicated filling line, including weighing),
Roller application or brushing,
Non industrial spraying
Treatment of articles by dipping and pouring,
Use as laboratory reagent,
General greasing /lubrication at high kinetic energy conditions
Manual activities involving hand contact

Product features

Concentration of the substance in the mixture / article	Covers concentrations up to 100 %.
Physical form (at the time of use)	Liquefied gas

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Frequency and duration of use

Frequency of use	220 days/ year
Remarks	Covers daily exposures up to 12 hours (unless specified otherwise)

Human factors that are not influenced by risk management

Exposure through the skin	Palms of both hands (480 cm ²)
Respiratory volume	10 m ³ /day

Technical conditions and measures

Provide a good level of general or controlled ventilation. Handle the substance inside a closed system. Automated activity to the extent possible

Organizational measures to prevent / limit releases, dispersions, and exposures

Ensure that employees are trained to reduce exposures as much as possible. Inspect, test and regularly maintain all control measures

Conditions and measures related to the assessment of personal protection, hygiene and health

Where there is a risk of exposure: Wear personal protective equipment

2.5.3 Contribution Scenario for Controlling Workers' Exposure for PROC1: Chemical production or refinery in closed process without likelihood of exposure


Remarks	See 2.5.2 "Scenario of contribution to controlling worker exposure for: General measures"
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2.5.4 Contributing scenario for controlling worker exposure for PROC2: Chemical production or refinery in closed continuous process with occasional controlled exposure

Technical conditions and measures	Sample through a closed loop or other system to avoid exposure. Ensure that samples are obtained under confinement or with extraction ventilation. Isolate activity from other operations
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2.5.5 Scenario of contribution to controlling worker exposure for PROC3, PROC4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure Chemical production where opportunity for exposure arises

Remarks	See 2.5.2 "Scenario of contribution to controlling worker exposure for: General measures"
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**2.5.6 Scenario of contribution to controlling worker exposure for PROC5:
Mixing or blending in batch processes**

Remarks See 2.5.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.5.7 Scenario of contribution to controlling worker exposure for PROC8a, PROC8b:
Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
Transfer of substance or mixture (charging and discharging) at dedicated facilities**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation

**2.5.8 Scenario of contribution to controlling worker exposure for PROC9:
Transfer of substance or mixture into small containers (dedicated filling line, including weighing)**

Technical conditions and measures Ensure material transfers are under containment or extract ventilation
Keep the container tightly closed

**2.5.9 Scenario of contribution to controlling worker exposure for PROC10:
Roller application or brushing**

Remarks See 2.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.5.10 Scenario of contribution to controlling worker exposure for PROC11:
Non industrial spraying**

Remarks See 2.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.5.11 Scenario of contribution to controlling worker exposure for PROC13:
Treatment of articles by dipping and pouring**

Remarks See 2.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.5.12 Scenario of contribution to controlling worker exposure for PROC15:
Use as laboratory reagent**

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Other operational conditions affecting worker exposure

Exterior / Interior

Interior

Technical conditions and measures

Ensure a good level of general ventilation. Natural ventilation comes from doors, windows etc. Controlled ventilation means that there is a supply or withdrawal of air by an electric fan

**2.5.13 Scenario of contribution to controlling worker exposure for PROC18:
 General greasing /lubrication at high kinetic energy conditions**

Remarks

See 2.2 "Scenario of contribution to controlling worker exposure for: General measures"

**2.5.14 Scenario of contribution to controlling worker exposure for PROC19:
 Manual activities involving hand contact**

Remarks

See 2.2 "Scenario of contribution to controlling worker exposure for: General measures"

2.5.15 Exposure estimation and reference of its source

Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PROC1	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
	ECETOC TRA	Exterior, systemic, Acute effects - local, Chronic effects - local	Inhalation	< 0,01 mg/m ³	< 0,01
PROC2	ECETOC TRA	Exterior, systemic	Dermal	1,37 mg/kg pc/jour	0,02
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg pc/jour	0,002
	ECETOC TRA	Exterior, systemic	Inhalation	< 24,79 mg/m ³	< 0,52
		Exterior, Acute effects - local	Inhalation	< 24,79 mg/m ³	< 0,69
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,24 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10

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		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25
PROC3	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg pc/jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg pc/jour	0,001
PROC4	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
PROC3, PROC4	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,05
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,07
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 2,48 mg/m ³	< 0,18
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 7,08 mg/m ³	< 0,15
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 7,08 mg/m ³	< 0,20
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 7,08 mg/m ³	< 0,51
PROC5	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg pc/jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,07 mg/kg pc/jour	0,001
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC8a	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg p.c./jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,14 mg/kg p.c./jour	0,002
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13

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		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC8b	ECETOC TRA	Exterior, systemic	Dermal	6,86 mg/kg pc/jour	0,101
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg pc/jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,08
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,10
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 3,72 mg/m ³	< 0,27
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,19 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,19 mg/m ³	< 0,09
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,19 mg/m ³	< 0,23
PROC9	ECETOC TRA	Exterior, Interior sans Ventilation avec Aspiration à la Source	Dermal	6,86 mg/kg p.c./jour	0,101
		Interior with ventilation with suction at the source	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,10
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,14
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 4,96 mg/m ³	< 0,35
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 14,17 mg/m ³	< 0,30
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 14,17 mg/m ³	< 0,39
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,71 mg/m ³	< 0,05

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PROC10	ECETOC TRA	Interior with ventilation, Systemic, long term	Dermal	0.69 mg/m ³	0.1
		Interior with ventilation, Systemic, long term	Inhalation	1.09 mg/m ³	0.08
PROC11	ECETOC TRA				
PROC13	ECETOC TRA	Exterior, systemic	Dermal	13,71 mg/kg p.c./jour	0,202
		Interior with ventilation with suction at the source, Systemic	Dermal	0,69 mg/kg p.c./jour	0,01
	ECETOC TRA	Exterior, systemic, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,13
		Exterior, Acute effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,17
		Exterior, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 6,20 mg/m ³	< 0,44
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 17,71 mg/m ³	< 0,37
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 17,71 mg/m ³	< 0,49
		Interior with ventilation with suction at the source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 0,89 mg/m ³	< 0,06
PROC15	ECETOC TRA	Exterior, systemic	Dermal	0,34 mg/kg p.c./jour	0,005
		Interior with ventilation with suction at the source, Systemic	Dermal	0,03 mg/kg p.c./jour	0,001
	ECETOC TRA	Interior sans Ventilation avec Aspiration à la Source, Systemic	Inhalation	< 35,42 mg/m ³	< 0,74
		Interior sans Ventilation avec Aspiration à la Source, Acute effects - local	Inhalation	< 35,42 mg/m ³	< 0,98
		Interior sans Ventilation avec Aspiration à la Source, Chronic effects - local, With RPE (95% efficiency)	Inhalation	< 1,77 mg/m ³	< 0,13
		Interior with ventilation with suction at the source, Systemic	Inhalation	< 3,54 mg/m ³	< 0,07
		Interior with ventilation with suction at the source, Acute effects - local	Inhalation	< 3,54 mg/m ³	< 0,10
		Interior with ventilation with suction at the source, Chronic effects - local	Inhalation	< 3,54 mg/m ³	< 0,25

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PROC19	ECETOC TRA	Interior with ventilation, Systemic, Long term	Inhalation	10.94 mg/m ³	0.78
		Interior with ventilation, Systemic, long term	Dermal	1.41 mg/kg pc/jour	0.2

2.5.16 Advice to downstream user to evaluate whether he works within the boundaries set by the Exposure Scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks / operational conditions are adopted, the user must ensure that the risks are managed at least at an equivalent level

2.6 Consumer use, Use generating wide dispersion, (<25% Aqueous solution)

Main user groups


SU21 Uses by consumers: Private households (= general public = consumers)

Categories of chemicals

PC1 Adhesives, sealants
 PC9a Coatings and paints, thinners, paint removers
 PC9b Fillers, putties, plasters, modelling clay
 PC9c Finger paints
 PC12 Fertilizers
 PC16 Heat transfer fluids
 PC18 Ink and toners
 PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
 PC23 Leather treatment products
 PC35 Washing and cleaning products
 PC37 Water treatment chemicals
 PC39 Cosmetics, personal care products

Categories of release into the environment

ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
 ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
 ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
 ERC8e Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

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ERC8f	Widespread use leading to inclusion into/onto article (outdoor)
ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)
ERC11	Widespread use of articles with low release (indoor)

2.6.1 Scenario contributing to the control of the environmental exposure for ERC8a, ERC8b, ERC8d, ERC8e, ERC8f, ERC9a, ERC9b, ERC11a:

Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor),
Widespread use of reactive processing aid (no inclusion into or onto article, indoor),
Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor),
Widespread use of reactive processing aid (no inclusion into or onto article, outdoor),
Widespread use leading to inclusion into/onto article (outdoor),
Widespread use of functional fluid (indoor),
Widespread use of functional fluid (outdoor),
Widespread use of articles with low release (indoor)

Remarks Non applicable

**2.6.2 Scenario of contribution to controlling worker exposure for PC9a:
Coatings and paints, thinners, paint removers**

Product features

Concentration of the Substance in the Mixture / Article Covers concentrations up to 0.05 %. (NH₃)

Frequency and duration of use

Frequency of use 1 time per month

**2.6.3 Scenario of contribution to controlling worker exposure for PC35:
Washing and cleaning products**

Product features

Concentration of the substance in the mixture / article Covers concentrations up to 125 %. (NH₃)

Frequency and duration of use

Frequency of use 104 times per year

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**2.6.4 Scenario of contribution to controlling worker exposure for PC39 :
Cosmetics, personal care products**
Product features


Concentration of the substance in the mixture / article Covers concentrations up to 4%. (NH₃)

Frequency and duration of use

Frequency of use 1 time per month

2.6.5 Exposure estimation and reference of its source
Workers

Contribution to the scenario	Exposure Assessment Methods	Specific conditions	Type of value	Exposure level	RCR
PC9a	ECETOC TRA	Applying paint by brush and roller			
		Acute effects, Systemic	Dermal	0,03 mg/kg pc/jour	0,00044
		Acute effects - local	Inhalation	7 mg/m ³	0,97
		Spray painting			
		Acute effects, Systemic	Dermal	0,013 mg/kg pc/jour	0,00019
		Acute effects - local	Inhalation	0,67 mg/m ³	0,09
		General application of diapers			
		Acute effects, Systemic	Dermal	0,0021 mg/kg pc/jour	0,00031
		Acute effects - local	Inhalation	6,7 mg/m ³	0,93
		Paint stripper application			
		Acute effects, Systemic	Dermal	0,0042 mg/kg pc/jour	0,00062
		Acute effects - local	Inhalation	3,2 mg/m ³	0,44
PC35	ECETOC TRA	Acute effects, Systemic	Dermal	0,41 mg/kg pc/jour	0,006
		Long term, Systemic	Dermal	0,12 mg/kg pc/jour	0,002
		Acute effects - local	Inhalation	3,3 mg/m ³	0,46
		Systemic	Inhalation	0,16 mg/m ³	0,0067
		Chronic effects - local	Inhalation	0,16 mg/m ³	0,06
PC39	ECETOC TRA	Hair colour application			
		Acute effects, Systemic	Dermal	67 mg/kg pc/jour	0,99
		Long term, Systemic	Dermal	2,203 mg/kg pc/jour	0,0324

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2.6.6 Advice to downstream user to evaluate whether he works within the boundaries set by the Exposure Scenario

The available safety data sheet informs the user of the risk management measures and operating conditions that allow him to work safely with the substance or mixture. If other risk management / operational conditions are adopted, the user must ensure that risks are managed at least at an equivalent level