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

1.1. Product identifier

Trade name : Ammonia, anhydrous, Ammonia, Ammonia N38, Ammonia HG, Ammonia LGC
SDS no : NOAL_0002
Other means of identification : Ammonia, anhydrous
CAS-No. : 7664-41-7
EC-No. : 231-635-3
EC Index-No. : 007-001-00-5
REACH registration No : 01-2119488876-14
Chemical formula : NH3

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

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.
Test gas/Calibration gas.
Laboratory use.
Contact supplier for more information on uses.
Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet

Company identification

Supplier
AIR LIQUIDE FINLAND OY
Yrttipellontie 1 C 3 krs.
90230 OULU - FINLAND
T +353 20 779 0580
info.finland@airliquide.com

E-Mail address (competent person) : eunordic-sds@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : FI: Myrkytystietokeskus: 09-471 977 (suora) tai 09-4711 (vaihde) / EN: Poison Information Centre: 09-471 977 (direct) or 09-4711 (switchboard)
Availability
(24 / 7)

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	Acute toxicity (inhalation:gas) Category 3	H331
	Skin corrosion/irritation, Category 1, Sub-Category 1B	H314
	Serious eye damage/eye irritation, Category 1	H318
Environmental hazards	Hazardous to the aquatic environment – Acute Hazard, Category 1	H400
	Hazardous to the aquatic environment – Chronic Hazard, Category 2	H411

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS04 GHS05 GHS06 GHS09

Signal word (CLP) : Danger

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

Precautionary statements (CLP)

- Prevention : P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

- Response : P391 - Collect spillage.
P321 - Specific treatment (see supplemental first aid instruction on this label).
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310 - Immediately call a POISON CENTER or doctor.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.
P381 - In case of leakage, eliminate all ignition sources.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

- Storage : P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P403 - Store in a well-ventilated place.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

- Disposal considerations : P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards

None.
Not classified as PBT or vPvB.
The substance/mixture has no endocrine disrupting properties.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Ammonia, anhydrous	CAS-No.: 7664-41-7 EC-No.: 231-635-3 EC Index-No.: 007-001-00-5 REACH 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

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

3.2. Mixtures Not established.

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product.
Material is destructive to tissue of the mucuous membranes and upper respiratory tract.
Cough, shortness of breath, headache, nausea.
See section 11.

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

Obtain medical assistance.
Treat with corticosteroid spray as soon as possible after inhalation.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Shutting off the source of the gas is the preferred method of control.
- Unsuitable extinguishing media : Do not use water jet to extinguish.
  Carbon dioxide.

5.2. Special hazards arising from the substance or mixture

Specific hazards : Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products : Nitric oxide/nitrogen dioxide.

5.3. Advice for firefighters

Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Move containers away from the fire area if this can be done without risk.

Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Act in accordance with local emergency plan.
Try to stop release.
Evacuate area.
Ensure adequate air ventilation.
Eliminate ignition sources.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment

For emergency responders : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Use chemically protective clothing.
Monitor concentration of released product.
Consider the risk of potentially explosive atmospheres.
See section 5.3 of the SDS for more information.

6.2. Environmental precautions

Reduce vapour with fog or fine water spray.
Try to stop release.

6.3. Methods and material for containment and cleaning up

Hose down area with water.
Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product : Do not breathe gas.
Avoid release of product into atmosphere.
The product must be handled in accordance with good industrial hygiene and safety procedures.
Only experienced and properly instructed persons should handle gases under pressure.
Consider pressure relief device(s) in gas installations.
Ensure the complete gas system was (or is regularily) checked for leaks before use.
Do not smoke while handling product.
Avoid exposure, obtain special instructions before use.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Installation of a cross purge assembly between the container and the regulator is recommended.
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
Avoid suck back of water, acid and alkalis.
Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
Purge air from system before introducing gas.
Take precautionary measures against static discharge.
Keep away from ignition sources (including static discharges).
Consider the use of only non-sparking tools.
Ensure equipment is adequately earthed.

Safe handling of the gas receptacle : Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect containers from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the content of the container.
Suck back of water into the container must be prevented.
Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Container valve guards or caps should be in place.
Containers should be stored in the vertical position and properly secured to prevent them from falling over.
Stored containers should be periodically checked for general condition and leakage.
Keep container below 50°C in a well ventilated place.
Store containers in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.
Segregate from oxidant gases and other oxidants in store.
All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ammonia, anhydrous (7664-41-7)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Ammonia, anhydrous
IOEL TWA	14 mg/m³
IOEL TWA [ppm]	20 ppm
IOEL STEL	36 mg/m³
IOEL STEL [ppm]	50 ppm
Austria - Occupational Exposure Limits	
Local name	Ammoniak
MAK (mg/m³)	14 mg/m³
MAK (OEL TWA) [ppm]	20 ppm
MAK (OEL STEL)	36 mg/m³
MAK (OEL STEL) [ppm]	50 ppm
Belgium - Occupational Exposure Limits	
Local name	Ammoniac # Ammoniak
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Bulgaria - Occupational Exposure Limits	
Local name	Амоняк
OEL TWA	14 mg/m³

OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Remark	• (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Croatia - Occupational Exposure Limits	
Local name	Amonijak, bezvodni
GVI (OEL TWA) [1]	14 mg/m³
GVI (OEL TWA) [2]	20 ppm
KGVI (OEL STEL)	36 mg/m³
KGVI (OEL STEL) [ppm]	50 ppm
Remark	K, T, N, EU*
Czech Republic - Occupational Exposure Limits	
Local name	Amoniak
PEL (OEL TWA)	14 mg/m³
PEL (OEL TWA) [ppm]	20.13 ppm
NPK-P (OEL C)	36 mg/m³
NPK-P (OEL C) [ppm]	51.77 ppm
Denmark - Occupational Exposure Limits	
Local name	Ammoniak
OEL TWA [1]	14 mg/m³
OEL TWA [2]	20 ppm
Estonia - Occupational Exposure Limits	
Local name	Ammoniaak
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Finland - Occupational Exposure Limits	
Local name	Vedetön ammoniakki
HTP (OEL TWA) [1]	14 mg/m³
HTP (OEL TWA) [2]	20 ppm
HTP (OEL STEL)	36 mg/m³
HTP (OEL STEL) [ppm]	50 ppm
France - Occupational Exposure Limits	
Local name	Ammoniac anhydre

VME (OEL TWA)	7 mg/m³
VME (OEL TWA) [ppm]	10 ppm
VLE (OEL C/STEL)	14 mg/m³
VLE (OEL C/STEL) [ppm]	20 ppm
Remark	Valeurs règlementaires contraignantes
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Ammoniak
AGW (OEL TWA) [1]	14 mg/m³
AGW (OEL TWA) [2]	20 ppm
Remark	DFG,EU,Y
Greece - Occupational Exposure Limits	
OEL TWA	35 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	35 mg/m³
OEL STEL [ppm]	50 ppm
Hungary - Occupational Exposure Limits	
Local name	AMMÓNIA
AK (OEL TWA)	14 mg/m³
CK (OEL STEL)	36 mg/m³
Ireland - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
OEL TWA [1]	14 mg/m³
OEL TWA [2]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Italy - Occupational Exposure Limits	
Local name	Ammoniaca anidra
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Latvia - Occupational Exposure Limits	
Local name	Amonjaks
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³

OEL STEL [ppm]	50 ppm
Lithuania - Occupational Exposure Limits	
Local name	Amoniakas (bevandenis)
IPRV (OEL TWA)	14 mg/m³
IPRV (OEL TWA) [ppm]	20 ppm
TPRV (OEL STEL)	36 mg/m³
TPRV (OEL STEL) [ppm]	50 ppm
Luxembourg - Occupational Exposure Limits	
Local name	Ammoniac anhydre
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Malta - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Netherlands - Occupational Exposure Limits	
Local name	Ammoniak
TGG-8u (OEL TWA)	14 mg/m³
TGG-15min (OEL STEL)	36 mg/m³
Poland - Occupational Exposure Limits	
Local name	Amoniak
NDS (OEL TWA)	14 mg/m³
NDSCh (OEL STEL)	28 mg/m³
Portugal - Occupational Exposure Limits	
Local name	Amoníaco
OEL TWA [ppm]	25 ppm
OEL STEL [ppm]	35 ppm
Romania - Occupational Exposure Limits	
Local name	Amoniac
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³

OEL STEL [ppm]	50 ppm
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA) [1]	14 mg/m³
NPHV (OEL TWA) [2]	20 ppm
NPHV (OEL STEL)	36 mg/m³
Slovenia - Occupational Exposure Limits	
Local name	amonijak, brezvodni
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	35 mg/m³
OEL STEL [ppm]	50 ppm
Spain - Occupational Exposure Limits	
Local name	Amoníaco
VLA-ED (OEL TWA) [1]	14 mg/m³
VLA-ED (OEL TWA) [2]	20 ppm
VLA-EC (OEL STEL)	36 mg/m³
VLA-EC (OEL STEL) [ppm]	50 ppm
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo. Todos estos agentes químicos figuran al menos en una de las directivas de valores límite indicativos publicadas hasta ahora (ver Anexo C. Bibliografía). Los estados miembros disponen de un tiempo fijado en dichas directivas para su transposición a los valores límites de cada país miembro. Una vez adoptados, estos valores tienen la misma validez que el resto de los valores adoptados por el país).
Sweden - Occupational Exposure Limits	
Local name	Ammoniak
NGV (OEL TWA)	14 mg/m³
NGV (OEL TWA) [ppm]	20 ppm
KTV (OEL STEL)	36 mg/m³
KTV (OEL STEL) [ppm]	50 ppm
United Kingdom - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
WEL TWA (OEL TWA) [1]	18 mg/m³
WEL TWA (OEL TWA) [2]	25 ppm
WEL STEL (OEL STEL)	25 mg/m³
WEL STEL (OEL STEL) [ppm]	35 ppm
Iceland - Occupational Exposure Limits	
Local name	Ammóníak

OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Remark	H
Norway - Occupational Exposure Limits	
Local name	Ammoniakk
Grenseverdi (OEL TWA) [1]	18 mg/m³
Grenseverdi (OEL TWA) [2]	25 ppm
Switzerland - Occupational Exposure Limits	
Local name	Ammoniak
MAK (OEL TWA) [1]	14 mg/m³
MAK (OEL TWA) [2]	20 ppm
KZGW (OEL STEL)	28 mg/m³
KZGW (OEL STEL) [ppm]	40 ppm
Remark	SS_C - Auge$^{KT\ HU}$ & OAW$^{KT\ HU}$ - NIOSH, OSHA
USA - ACGIH - Occupational Exposure Limits	
Local name	Ammonia
ACGIH OEL TWA [ppm]	25 ppm
ACGIH OEL STEL [ppm]	35 ppm
Remark (ACGIH)	Eye dam; URT irr

Ammonia, anhydrous (7664-41-7)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Ammonia, anhydrous
IOEL TWA	14 mg/m³
IOEL TWA [ppm]	20 ppm
IOEL STEL	36 mg/m³
IOEL STEL [ppm]	50 ppm
Austria - Occupational Exposure Limits	
Local name	Ammoniak
MAK (mg/m³)	14 mg/m³
MAK (OEL TWA) [ppm]	20 ppm
MAK (OEL STEL)	36 mg/m³
MAK (OEL STEL) [ppm]	50 ppm

Belgium - Occupational Exposure Limits	
Local name	Ammoniac # Ammoniak
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Bulgaria - Occupational Exposure Limits	
Local name	Амоняк
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Remark	• (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Croatia - Occupational Exposure Limits	
Local name	Amonijak, bezvodni
GVI (OEL TWA) [1]	14 mg/m³
GVI (OEL TWA) [2]	20 ppm
KGVI (OEL STEL)	36 mg/m³
KGVI (OEL STEL) [ppm]	50 ppm
Remark	K, T, N, EU*
Czech Republic - Occupational Exposure Limits	
Local name	Amoniak
PEL (OEL TWA)	14 mg/m³
PEL (OEL TWA) [ppm]	20.13 ppm
NPK-P (OEL C)	36 mg/m³
NPK-P (OEL C) [ppm]	51.77 ppm
Denmark - Occupational Exposure Limits	
Local name	Ammoniak
OEL TWA [1]	14 mg/m³
OEL TWA [2]	20 ppm
Estonia - Occupational Exposure Limits	
Local name	Ammoniaak
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³

OEL STEL [ppm]	50 ppm
Finland - Occupational Exposure Limits	
Local name	Vedetön ammoniakki
HTP (OEL TWA) [1]	14 mg/m³
HTP (OEL TWA) [2]	20 ppm
HTP (OEL STEL)	36 mg/m³
HTP (OEL STEL) [ppm]	50 ppm
France - Occupational Exposure Limits	
Local name	Ammoniac anhydre
VME (OEL TWA)	7 mg/m³
VME (OEL TWA) [ppm]	10 ppm
VLE (OEL C/STEL)	14 mg/m³
VLE (OEL C/STEL) [ppm]	20 ppm
Remark	Valeurs règlementaires contraignantes
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Ammoniak
AGW (OEL TWA) [1]	14 mg/m³
AGW (OEL TWA) [2]	20 ppm
Remark	DFG,EU,Y
Greece - Occupational Exposure Limits	
OEL TWA	35 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	35 mg/m³
OEL STEL [ppm]	50 ppm
Hungary - Occupational Exposure Limits	
Local name	AMMÓNIA
AK (OEL TWA)	14 mg/m³
CK (OEL STEL)	36 mg/m³
Ireland - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
OEL TWA [1]	14 mg/m³
OEL TWA [2]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Italy - Occupational Exposure Limits	
Local name	Ammoniaca anidra

OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Latvia - Occupational Exposure Limits	
Local name	Amonjaks
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Lithuania - Occupational Exposure Limits	
Local name	Amoniakas (bevandenis)
IPRV (OEL TWA)	14 mg/m³
IPRV (OEL TWA) [ppm]	20 ppm
TPRV (OEL STEL)	36 mg/m³
TPRV (OEL STEL) [ppm]	50 ppm
Luxembourg - Occupational Exposure Limits	
Local name	Ammoniac anhydre
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Malta - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Netherlands - Occupational Exposure Limits	
Local name	Ammoniak
TGG-8u (OEL TWA)	14 mg/m³
TGG-15min (OEL STEL)	36 mg/m³
Poland - Occupational Exposure Limits	
Local name	Amoniak
NDS (OEL TWA)	14 mg/m³
NDSCh (OEL STEL)	28 mg/m³

Portugal - Occupational Exposure Limits	
Local name	Amoníaco
OEL TWA [ppm]	25 ppm
OEL STEL [ppm]	35 ppm
Romania - Occupational Exposure Limits	
Local name	Amoniac
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA) [1]	14 mg/m³
NPHV (OEL TWA) [2]	20 ppm
NPHV (OEL STEL)	36 mg/m³
Slovenia - Occupational Exposure Limits	
Local name	amonijak, brezvodni
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	35 mg/m³
OEL STEL [ppm]	50 ppm
Spain - Occupational Exposure Limits	
Local name	Amoníaco
VLA-ED (OEL TWA) [1]	14 mg/m³
VLA-ED (OEL TWA) [2]	20 ppm
VLA-EC (OEL STEL)	36 mg/m³
VLA-EC (OEL STEL) [ppm]	50 ppm
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo. Todos estos agentes químicos figuran al menos en una de las directivas de valores límite indicativos publicadas hasta ahora (ver Anexo C. Bibliografía). Los estados miembros disponen de un tiempo fijado en dichas directivas para su transposición a los valores límites de cada país miembro. Una vez adoptados, estos valores tienen la misma validez que el resto de los valores adoptados por el país).
Sweden - Occupational Exposure Limits	
Local name	Ammoniak
NGV (OEL TWA)	14 mg/m³
NGV (OEL TWA) [ppm]	20 ppm
KTV (OEL STEL)	36 mg/m³

KTV (OEL STEL) [ppm]	50 ppm
United Kingdom - Occupational Exposure Limits	
Local name	Ammonia, anhydrous
WEL TWA (OEL TWA) [1]	18 mg/m³
WEL TWA (OEL TWA) [2]	25 ppm
WEL STEL (OEL STEL)	25 mg/m³
WEL STEL (OEL STEL) [ppm]	35 ppm
Iceland - Occupational Exposure Limits	
Local name	Ammóníak
OEL TWA	14 mg/m³
OEL TWA [ppm]	20 ppm
OEL STEL	36 mg/m³
OEL STEL [ppm]	50 ppm
Remark	H
Norway - Occupational Exposure Limits	
Local name	Ammoniakk
Grenseverdi (OEL TWA) [1]	18 mg/m³
Grenseverdi (OEL TWA) [2]	25 ppm
Switzerland - Occupational Exposure Limits	
Local name	Ammoniak
MAK (OEL TWA) [1]	14 mg/m³
MAK (OEL TWA) [2]	20 ppm
KZGW (OEL STEL)	28 mg/m³
KZGW (OEL STEL) [ppm]	40 ppm
Remark	SS_C - Auge$^{KT\ HU}$ & OAW$^{KT\ HU}$ - NIOSH, OSHA
USA - ACGIH - Occupational Exposure Limits	
Local name	Ammonia
ACGIH OEL TWA [ppm]	25 ppm
ACGIH OEL STEL [ppm]	35 ppm
Remark (ACGIH)	Eye dam; URT irr

Ammonia, anhydrous (7664-41-7)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	36 mg/m³
Acute - systemic effects, inhalation	47.6 mg/m³
Long-term - local effects, inhalation	14 mg/m³

Long-term - systemic effects, inhalation	47.6 mg/m³
Acute - systemic effects, dermal	6.8 mg/kg bw/day
Long-term - systemic effects, dermal	6.8 mg/kg bw/day

Ammonia, anhydrous (7664-41-7)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	36 mg/m³
Acute - systemic effects, inhalation	47.6 mg/m³
Long-term - local effects, inhalation	14 mg/m³
Long-term - systemic effects, inhalation	47.6 mg/m³
Acute - systemic effects, dermal	6.8 mg/kg bw/day
Long-term - systemic effects, dermal	6.8 mg/kg bw/day

Ammonia, anhydrous (7664-41-7)	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.0011 mg/l
Aqua (marine water)	0.0011 mg/l

Ammonia, anhydrous (7664-41-7)	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.0011 mg/l
Aqua (marine water)	0.0011 mg/l

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation.
Product to be handled in a closed system.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Gas detectors should be used when toxic gases may be released.
Consider the use of a work permit system e.g. for maintenance activities.

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

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.
The following recommendations should be considered:
PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection : Wear goggles and a face shield when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection - specifications.
Provide readily accessible eye wash stations and safety showers.

• Skin protection

- Hand protection	:	Wear chemically resistant protective gloves. Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher. Standard EN 511 - Cold insulating gloves. Standard EN 374 - Protective gloves against chemicals. Permeation time: minimum >30min short term exposure: material / thickness Chloroprene rubber (Neoprene®) (CR) / 0,5 [mm]. Permeation time: minimum >480min long term exposure : material / thickness Butyl rubber (IIR) / 0,7 [mm]. Consult glove manufacturer´s product information on material suitability and material thickness. The breakthrough time of the selected gloves must be greater than the intended use period.
- Other	:	Keep suitable chemically resistant protective clothing readily available for emergency use. Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals. Wear safety shoes while handling containers. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
• Respiratory protection	:	Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Consult respiratory device supplier´s product information for the selection of the appropriate device. Keep self contained breathing apparatus readily available for emergency use. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
• Thermal hazards	:	None in addition to the above sections.

8.2.3. Environmental exposure controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

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	:	Odourless. Odour threshold is subjective and inadequate to warn of overexposure.
pH	:	Not applicable for gases and gas mixtures.
Melting point / Freezing point	:	-77.7 °C -77.7 °C
Boiling point	:	-33 °C
Flash point	:	Not applicable for gases and gas mixtures.
Flammability	:	Flammable gas.
Explosive limits	:	15.4 – 33.6 vol %
Lower explosion limit	:	Not available
Upper explosion limit	:	Not available
Vapour pressure [20°C]	:	8.6 bar(a)
Vapour pressure [50°C]	:	20 bar(a)
Density	:	Not applicable
Vapour density	:	Not applicable for gases and gas mixtures.
Relative density, liquid (water=1)	:	0.7
Relative density, gas (air=1)	:	0.6
Water solubility	:	517 g/l
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable for inorganic products.
Auto-ignition temperature	:	630 °C
Decomposition temperature	:	Not applicable.
Viscosity, kinematic	:	Not applicable for gases and gas mixtures.
Particle characteristics	:	Not applicable for gases and gas mixtures.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	:	Not applicable.
Oxidising properties	:	Not applicable.
Tci	:	40.1 %
Critical temperature [°C]	:	132 °C

9.2.2. Other safety characteristics

Molar mass	:	17 g/mol
Gas group	:	Press. Gas (Liq.)

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 normal conditions.

10.3. Possibility of hazardous reactions

None.
Can form explosive mixture with air.
May react violently with oxidants.

Reactivity : This mixture contains components with the following reactivity : Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid

Avoid moisture in installation systems.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5. Incompatible materials

With water causes rapid corrosion of some metals.
Reacts with water to form corrosive acids.
May react violently with alkalis.
Air, Oxidisers.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

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

Acute toxicity : Toxic if inhaled.

LC50 Inhalation - Rat [ppm]	2000 ppm/4h

Ammonia, anhydrous (7664-41-7)	
LC50 Inhalation - Rat [ppm]	2000 ppm/4h

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitisation : No known effects from this product.

Germ cell mutagenicity : No known effects from this product.

Carcinogenicity : No known effects from this product.

Toxic for reproduction : Fertility : No known effects from this product.

Toxic for reproduction : unborn child : No known effects from this product.

STOT-single exposure : Severe corrosion to the respiratory tract at high concentrations.

STOT-repeated exposure : No known effects from this product.

Aspiration hazard : Not applicable for gases and gas mixtures.

11.2. Information on other hazards

Other information : The substance/mixture has no endocrine disrupting properties.

SECTION 12: Ecological information

12.1. Toxicity

Assessment : Very toxic to aquatic life.
Toxic to aquatic life with long lasting effects.

EC50 48h - Daphnia magna [mg/l] : 101 mg/l
EC50 72h - Algae [mg/l] : No data available.
LC50 96 h - Fish [mg/l] : 0.89 mg/l

Ammonia, anhydrous (7664-41-7)	
EC50 48h - Daphnia magna [mg/l]	101 mg/l
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	0.89 mg/l

12.2. Persistence and degradability

Assessment : No data available.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

The substance/mixture has no endocrine disrupting properties.

12.7. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.
Effect on the ozone layer : None.
Effect on global warming : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
Must not be discharged to atmosphere.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org for more guidance on suitable disposal methods.
Return unused product in original container to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number or ID number

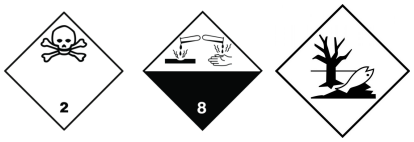
In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1005

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : AMMONIA, ANHYDROUS
Transport by air (ICAO-TI / IATA-DGR) : Ammonia, anhydrous
Transport by sea (IMDG) : AMMONIA, ANHYDROUS

14.3. Transport hazard class(es)

Labelling :



2.3 : Toxic gases.
8 : Corrosive substances.
Environmentally hazardous substances

Transport by road/rail (ADR/RID)
Class : 2
Classification code : 2TC
Hazard identification number : 268
Tunnel Restriction : C/D - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

Transport by sea (IMDG)
Class / Div. (Sub. risk(s)) : 2.3 (8)
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail (ADR/RID) : Not established.
Transport by air (ICAO-TI / IATA-DGR) : Not established.
Transport by sea (IMDG) : Not established.

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : Environmentally hazardous substance / mixture.
Transport by air (ICAO-TI / IATA-DGR) : Environmentally hazardous substance / mixture.
Transport by sea (IMDG) : Marine pollutant

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : Forbidden.

Cargo Aircraft only : Forbidden.

Transport by sea (IMDG) : P200

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

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

EU-Regulations

Restrictions on use : None.

National legislation : Ensure all national/local regulations are observed.

Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

Ensure all national/local regulations are observed.

Germany

Water hazard class (WGK) : WGK 2, Significantly hazardous to water (Classification according to AwSV)

National Rules and Recommendations : [German regulations] BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 Ortsbewegliche Druckgasbehälter", TRBS 2141, BGRegel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900." BGR 104, TRBS 2152.

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

SZW-lijst van reprotoxische stoffen – Borstvoeding : The substance is not listed

SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The substance is not listed

SZW-lijst van reprotoxische stoffen – Ontwikkeling : The substance is not listed

Denmark

Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

Switzerland

Storage class (LK) : LK 2 - Liquefied or pressurized gases

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes : Safety data sheet in accordance with commission regulation (EU) No 2020/878.

Abbreviations and acronyms : ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
LC50 - Lethal Concentration to 50 % of a test population
RMM - Risk Management Measures
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT- SE : Specific Target Organ Toxicity - Single Exposure
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
IATA - International Air Transport Association
IMDG code - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK - Water Hazard Class
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
UFI : Unique Formula Identifier

Training advice : Users of breathing apparatus must be trained.
Ensure operators understand the flammability hazard.
Ensure operators understand the toxicity hazard.

Further information : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).
Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at http://www.Eiga.eu .

Full text of H- and EUH-statements	
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Aquatic Acute 1	Hazardous to the aquatic environment – Acute Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
EUH071	Corrosive to the respiratory tract.
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Flam. Gas 2	Flammable gases, Category 2
H221	Flammable gas.
H280	Contains gas under pressure; may explode if heated.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.
Press. Gas (Liq.)	Gases under pressure : Liquefied gas

Skin Corr. 1B	Skin corrosion/irritation, Category 1, Sub-Category 1B

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Annex to the safety data sheet

This Annex documents the Exposure Scenarios (ESs) related to the identified uses of the registered substance. The ESs detail protective measures for workers and the environment in addition to those described in sections 7, 8, 11, 12 and 13 of the SDS that are required to ensure that the potential exposure to workers and the environment remains within acceptable levels for each of the identified uses.

Table of contents of the Annex

1. EIGA002-1: Industrial uses, closed contained conditions

1.1. Title section

Industrial uses, closed contained conditions	
ES Ref.: EIGA002-1 Revision date: 7/1/2016	

Processes, tasks, activities covered	Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems

Environment	Use descriptors
CS1	ERC1
CS2	ERC2
CS3	ERC4
CS4	ERC6a
CS5	ERC6b
CS6	ERC7

Worker	Use descriptors
CS7	PROC1
CS8	PROC2
CS9	PROC3
CS10	PROC4
CS11	PROC8b
CS12	PROC9

Assessment method	ECETOC TRA 2.0 EUSES

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: ERC1

ERC1	Manufacture of the substance

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	950000 t/yr
Regional use tonnage:	6500000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.2. Control of environmental exposure: ERC2

ERC2	Formulation into mixture

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	1000000 t/yr
Regional use tonnage:	3800000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	

Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.3. Control of environmental exposure: ERC4

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	25000 t/yr
Regional use tonnage:	354000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.4. Control of environmental exposure: ERC6a

ERC6a	Use of intermediate

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	800000 t/yr
Regional use tonnage:	3800000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.5. Control of environmental exposure: ERC6b

ERC6b	Use of reactive processing aid at industrial site (no inclusion into or onto article)

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	25000 t/yr
Regional use tonnage:	354000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.6. Control of environmental exposure: ERC7

ERC7	Use of functional fluid at industrial site

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
Annual site tonnage:	25000 t/yr
Regional use tonnage:	354000 t/yr
Emission Days (days/year)	330

Technical and organisational conditions and measures	
Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Direct emissions to the municipal STP should not be made.	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	
Flow rate of receiving water at least:	18000 m³/d
Dilution of STP emissions at least:	10

1.2.7. Control of worker exposure: PROC1

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	

Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.2.8. Control of worker exposure: PROC2

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

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90

Wear a respirator providing a minimum efficiency of (%):	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.2.9. Control of worker exposure: PROC3

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

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90

Wear a respirator providing a minimum efficiency of (%):	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.2.10. Control of worker exposure: PROC4

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90

Wear a respirator providing a minimum efficiency of (%):	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.2.11. Control of worker exposure: PROC8b

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

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Fill containers at dedicated fill points supplied with local extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90

Wear a respirator providing a minimum efficiency of (%):	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.2.12. Control of worker exposure: PROC9

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

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Fill containers at dedicated fill points supplied with local extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90

Wear a respirator providing a minimum efficiency of (%):	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: ERC1

Assessment method	EUSES

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.000133	0.0011	0.121	
Marine water	mg/l	0.0000315	0.0011	0.029	

1.3.2. Environmental release and exposure: ERC2

Assessment method	EUSES

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.0000497	0.0011	0.045	
Marine water	mg/l	0.000012	0.0011	0.011	

1.3.3. Environmental release and exposure: ERC4

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.0000108	0.0011	0.01	
Marine water	mg/l	0.0000231	0.0011	0.021	

1.3.4. Environmental release and exposure: ERC6a

Assessment method	EUSES

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.0000837	0.0011	0.076	
Marine water	mg/l	0.0000205	0.0011	0.019	

1.3.5. Environmental release and exposure: ERC6b

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.00000173	0.0011	0.002	
Marine water	mg/l	0.00000019	0.0011	≈ 0.00018	

1.3.6. Environmental release and exposure: ERC7

Protection target	Unit	Exposure estimation	PNEC	RCR	Assessment conditions
Freshwater	mg/l	0.00000558	0.0011	0.005	
Marine water	mg/l	0.00000121	0.0011	0.001	

1.3.7. Worker exposure: PROC1

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.34 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.05
Inhalation - Long-term - systemic effects	0 mg/m³	Outdoor use, Indoor use , Without LEV	< 0.01
Dermal - Acute - systemic effects	0.34 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.05
Inhalation - Acute - systemic effects	0 mg/m³	Outdoor use, Indoor use , Without LEV	< 0.01
Acute - Local - Inhalation	0 mg/m³	Outdoor use, Indoor use , Without LEV	< 0.01
Long term - Local - Inhalation	0 mg/m³	Outdoor use, Indoor use , Without LEV	< 0.01

1.3.8. Worker exposure: PROC2

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	1.37 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.201
	0.14 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.021
Inhalation - Long-term - systemic effects	1.24 mg/m³	Outdoor use, With RPE95%	0.026
	3.54 mg/m³	Indoor use , With LEV, No RPE	0.074
Dermal - Acute - systemic effects	1.37 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.201
	0.14 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.021
Inhalation - Acute - systemic effects	1.24 mg/m³	Outdoor use, With RPE95%	0.026
	3.54 mg/m³	Indoor use , With LEV, No RPE	0.074
Acute - Local - Inhalation	1.24 mg/m³	Outdoor use, With RPE95%	0.034

	3.54 mg/m³	Indoor use , With LEV, No RPE	0.098
Long term - Local - Inhalation	1.24 mg/m³	Outdoor use, With RPE95%	0.089
	3.54 mg/m³	Indoor use , With LEV, No RPE	0.253

1.3.9. Worker exposure: PROC3

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.34 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.05
	0.03 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.004
Inhalation - Long-term - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Dermal - Acute - systemic effects	0.34 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, No gloves worn	0.05
	0.03 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.004
Inhalation - Acute - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Acute - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.069
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.197
Long term - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.177
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.506

1.3.10. Worker exposure: PROC4

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
Inhalation - Long-term - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Dermal - Acute - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
Inhalation - Acute - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Acute - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.069
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.197

Long term - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.177
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.506

1.3.11. Worker exposure: PROC8b

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
Inhalation - Long-term - systemic effects	3.72 mg/m³	Outdoor use, With RPE95%	0.078
	3.19 mg/m³	Indoor use , With LEV, No RPE	0.067
Dermal - Acute - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
Inhalation - Acute - systemic effects	3.72 mg/m³	Outdoor use, With RPE95%	0.078
	3.19 mg/m³	Indoor use , With LEV, No RPE	0.067
Acute - Local - Inhalation	3.72 mg/m³	Outdoor use, With RPE95%	0.103
	3.19 mg/m³	Indoor use , With LEV, No RPE	0.089
Long term - Local - Inhalation	3.72 mg/m³	Outdoor use, With RPE95%	0.266
	3.19 mg/m³	Indoor use , With LEV, No RPE	0.228

1.3.12. Worker exposure: PROC9

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No RPE	0.101
Inhalation - Long-term - systemic effects	4.96 mg/m³	Outdoor use, With RPE95%	0.104
	0.71 mg/m³	Indoor use , With LEV, With RPE	0.015
Dermal - Acute - systemic effects	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No RPE	0.101
Inhalation - Acute - systemic effects	4.96 mg/m³	Outdoor use, With RPE95%	0.104
	0.71 mg/m³	Indoor use , With LEV, With RPE	0.015
Acute - Local - Inhalation	4.96 mg/m³	Outdoor use, With RPE95%	0.138
	0.71 mg/m³	Indoor use , With LEV, With RPE	0.02
Long term - Local - Inhalation	4.96 mg/m³	Outdoor use, With RPE95%	0.354

	0.71 mg/m³	Indoor use , With LEV, With RPE	0.051

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

1.4.1. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see :

1.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see :

2. EIGA002-2: Professional uses

2.1. Title section

	Professional uses	
	ES Ref.: EIGA002-2 Revision date: 7/1/2016	

Processes, tasks, activities covered	Professional uses, including transfer of product in non-industrial settings

Environment	**Use descriptors**
CS1	ERC9a, ERC9b

Worker	**Use descriptors**
CS2	PROC4
CS3	PROC8a

Assessment method	ECETOC TRA 2.0

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: ERC9a, ERC9b

ERC9a	Widespread use of functional fluid (indoor)
ERC9b	Widespread use of functional fluid (outdoor)

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used, frequency and duration of use (or from service life)	
No additional information	

Technical and organisational conditions and measures	
Ensure operatives are trained to minimise exposure	

Conditions and measures related to sewage treatment plant	
No additional information	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
Closed systems are used in order to prevent unintended emissions	

2.2.2. Control of worker exposure: PROC4

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90
Wear a respirator providing a minimum efficiency of	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

2.2.3. Control of worker exposure: PROC8a

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

Product (article) characteristics	
Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure	
The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	≤ 8 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Drain down and flush system prior to equipment break-in or maintenance.	
Apply a good standard of general or controlled ventilation when maintenance activities are carried out.	
Ensure operatives are trained to minimise exposure	
Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	

Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection. Wear suitable face shield. Wear suitable coveralls to prevent exposure to the skin	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	90
Wear a respirator providing a minimum efficiency of	95 Mandatory if activities take place outdoors or indoors with no local exhaust ventilation
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor or outdoor use	

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: ERC9a, ERC9b

Qualitative approach used to conclude safe use,The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment. ,The resulting environmental exposure is not expected to add significantly to already present background levels of the gas in the environment ,An additional assessment for environmental exposure for wide dispersive uses has therefore not been presented in section 3.

2.3.2. Worker exposure: PROC4

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
Inhalation - Long-term - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Dermal - Acute - systemic effects	0.69 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.101
	0.69 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.101
Inhalation - Acute - systemic effects	2.48 mg/m³	Outdoor use, With RPE95%	0.052
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.149
Acute - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.069
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.197
Long term - Local - Inhalation	2.48 mg/m³	Outdoor use, With RPE95%	0.177
	7.08 mg/m³	Indoor use , With LEV, No RPE	0.506

2.3.3. Worker exposure: PROC8a

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects	0.14 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.021
	1.37 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.201
Inhalation - Long-term - systemic effects	6.2 mg/m³	Outdoor use, With RPE95%	0.13
	0.89 mg/m³	Indoor use , With LEV, No RPE	0.019
Dermal - Acute - systemic effects	0.14 mg/kg bodyweight/day	Indoor use , With LEV, No gloves worn	0.021
	1.37 mg/kg bodyweight/day	Outdoor use, Indoor use , Without LEV, Gloves worn (90% Reduction)	0.201

Inhalation - Acute - systemic effects	6.2 mg/m³	Outdoor use, With RPE95%	0.13
	0.89 mg/m³	Indoor use , With LEV, No RPE	0.019
Acute - Local - Inhalation	6.2 mg/m³	Outdoor use, With RPE95%	0.172
	0.89 mg/m³	Indoor use , With LEV, No RPE	0.025
Long term - Local - Inhalation	6.2 mg/m³	Outdoor use, With RPE95%	0.443
	0.89 mg/m³	Indoor use , With LEV, No RPE	0.064

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

2.4.1. Environment

Guidance - Environment	Check that RMMs and OCs are as described above or of equivalent efficiency

2.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see : http://www.ecetoc.org/tra

End of document