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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. Perform risk assessment prior to use 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
P403	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	Spray water to reduce vapors or divert the cloud of steam. 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

- Wear respiratory protection
- 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
- Do not let product enter drains
- All littering must be avoided

6.3. Methods and material for containment and cleaning up

- Wash the area with a water jet
- Ventilate the area
- Keep the area clear of all sources of ignition until all spilled liquid has evaporated (frost-free soil)
- Wash contaminated equipment and leak locations with plenty 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


- 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

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

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product

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
Wear cold insulating gloves when transferring or disconnecting transfer lines - Standard EN 511 - Insulating gloves against cold
Handle with gloves. Gloves must be inspected prior to use. Use appropriate glove removal technique to prevent skin from coming into contact with the product (i.e. without touching the outer surface of the glove). Discard contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands
The selected protective gloves have to satisfy the specifications of EU Directive 89/686 / EEC and the standard EN 374 derived from it

Respiratory protection

When the risk assessment shows that the wearing of respirators is appropriate, use a full face mask with multi-purpose cartridge (US) or type AXBEK (EN 14387). If the mask is the only means of protection, use a self-

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contained full face respirator. Use equipment that has been tested and approved by standards such as NIOSH (US) or CEN (EU)

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 (in closed cupel)

Evaporation rate Data not available

Flammability (solid, gas) Data not available

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

9.2. Other information

Molar mass 17 g/mol

Critical temperature [°C] 132 °C

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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

10.6. Hazardous decomposition products

Hazardous decomposition products are formed under fire conditions. -
 Nitrogen oxides (NO_x)
 Other decomposition products - no data available
 In case of fire: see section 5

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 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	Data not available
Germ cell mutagenicity	Data not available
Carcinogenicity	
Reproductive toxicity	Data not available

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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 CL50 - Daphnia magna (Grande daphnia) - 25,4 mg/l - 48 h
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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	Burn in a chemical incinerator equipped with an afterburner and scrubber but be very careful when lighting as this product is highly flammable. Return surplus and non-recyclable solutions to a licensed waste disposal company
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
P403	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