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

1.1. Product identifier

Trade name	Anhydrous ammonia, liquid ammonia, pure
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 Use as an intermediate Manufacturing additive Use in laboratories Chemical product for water treatment, Flue gas treatment (NO _x and SO _x reduction) Surface treatments in metallurgy Refrigerant fluid See the list of identified uses and exposure scenarios in the annex to the SDS Contact supplier for more information on uses
Uses advised against	For use by industrial or professional users only

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)

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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)
- 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]


Flammable gases, Category 2	H221
Gases under pressure : Liquefied gas	H280
Skin corrosion/irritation, Category 1B	H314
Acute toxicity (inhalation: gas) Category 3	H331
Hazardous to the aquatic environment — Acute Hazard, Category 1	H400
Hazardous to the aquatic environment — Chronic Hazard, Category 2	H411

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

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H314	Causes severe skin burns and eye damage
H331	Toxic if inhaled
H400	Very toxic to aquatic life
H411	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
P410+P403	Protect from sunlight. Store in a well-ventilated place
P405	Store locked up

2.3. Other hazards

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


SECTION 3: Composition/information on ingredients

3.1. Substances

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

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

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

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3.2. Mixtures

Not established

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

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

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

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

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


SECTION 5: Firefighting measures

5.1. Extinguishing media

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

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

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5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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

6.2. Environmental precautions

Avoid further spills or leaks, if it is safely possible

6.3. Methods and material for containment and cleaning up

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

6.4. Reference to other sections

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling


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

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

None

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Components with occupational exposure limits

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

8.2. Exposure controls

8.2.1. Appropriate engineering controls

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


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

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

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

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

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

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

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


8.2.3. Environmental exposure controls

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
• Physical state at 20°C / 101.3kPa	Gas liquified
• Colour	Colourless
Odour	Ammoniacal
Odour threshold	5 -25 ppm
pH	Data not available
Melting point / Freezing point	-77.7°C
Boiling point	-33.4°C
Flash point	132°C (Closed cup)
Evaporation rate	Data not available
Flammability (solid, gas)	Flammable gas
Explosive limits	16 -25 vol %
Vapour pressure [20°C]	8.57 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)	0.59
Water solubility	510 - 531 g/l
Partition coefficient n-octanol/water (Log Kow)	Data not available
Auto-ignition temperature	651 °C
Decomposition temperature	Data not available
Viscosity	Data not available
Explosive properties	Data not available
Oxidising properties	Data not available

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9.2. Other information

Molar mass	17.03 g/mol
Critical temperature [°C]	132 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under the recommended storage conditions

10.3. Possibility of hazardous reactions

Can form explosive mixture with air
May react violently with oxidants

10.4. Conditions to avoid

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

10.5. Incompatible materials

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


10.6. Hazardous decomposition products

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	Toxic if inhaled Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudo membrane formation
Skin corrosion/irritation	Causes severe skin burns
Serious eye damage/irritation	Causes serious eye damage
Respiratory or skin sensitisation	Data not available
Germ cell mutagenicity	Data not available
Carcinogenicity	Data not available
Reproductive toxicity	Data not available
STOT-single exposure – Target organ(s)	Severe corrosion to the respiratory tract at high concentrations

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May cause inflammation of the respiratory system

STOT-repeated exposure

Data not available

Ingestion hazard

Data not available

11.2. Information on other hazards

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

SECTION 12: Ecological information

12.1. Toxicity

Assessment

Very toxic to aquatic life.

Toxic to aquatic life with long lasting effects

12.2. Persistence and degradability

The substance is readily biodegradable. Unlikely to persist

12.3. Bioaccumulative potential

Does not show bioaccumulation

12.4. Mobility in soil

Once released, is absorbed by the soil

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. Endocrine-disrupting properties

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


12.7. Other adverse effects

Very toxic to aquatic organisms

Toxic to aquatic organisms, causes long-term adverse effects

In an aqueous environment, ammonia is predominantly present in the form of the ammonium ion (NH₄⁺) or in the form of ammonia (NH₃); the relative proportions depend on the pH. Toxicity to aquatic organisms is attributed to the non-ionised form of ammonia (NH₃)

Prevent the product from reaching groundwater, aquatic organisms or the sewage system

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

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

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

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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

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

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS : Chemical Abstract Service number (USA)

CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008

CSA : Chemical Safety Assessment

EIGA : European Industrial Gases Association

EINECS : European Inventory of Existing Commercial Chemical Substances

EN : European Standard

ATE : Acute Toxicity Estimate

IATA : International Air Transport Association

IMDG Code : International Maritime Dangerous Goods Code

LC50 : Lethal Concentration to 50 % of a test population

OMoD : Swiss Ordinance on the movement of waste

PBT : Persistent, Bioaccumulative and Toxic

PPE: Personal Protection Equipment

REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006


RID : Regulations concerning the international carriage of dangerous goods by rail

RMM : Risk Management Measures

STOT-SE : Specific Target Organ Toxicity - Single Exposure

UN : United Nations

vPvB : Very Persistent and Very Bioaccumulative

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WGK: Water Hazards Class

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
H400	Very toxic to aquatic life
H411	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
P410+P403	Protect from sunlight. Store in a well-ventilated place
P405	Store locked up

Disclaimer of liability

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