

**Ammonia****ALSA002**

2.3 : Toxic gas.



8 : Corrosive substance.

Environmentally  
hazardous substance.**Danger****SECTION 1. Identification of the substance/mixture and of the company/undertaking****Product identifier**

Trade name : Ammonia  
SDS Nr : ALSA002  
Chemical description : Anhydrous ammonia  
CAS No :007664-41-7  
EC No :231-635-3  
Index No :007-001-00-5  
Registration-No. : Registration deadline not expired.  
Chemical formula : NH<sub>3</sub>

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.  
Use as refrigerant Laboratory use Chemical reaction / Synthesis. Use for metal treatment  
Contact supplier for more uses information

**Details of the supplier of the safety data sheet**

Company identification : AIR LIQUIDE (PTY) LTD  
Cnr Vereeniging Road & Andre Marais Street  
Alrode, Alberton  
Gauteng SOUTH AFRICA  
Tel. : +27 87 288 1100  
E-Mail address (competent person) : scr.sales@airliquide.com

**Emergency telephone number**

Emergency telephone number : +27 87 288 1100

**SECTION 2. Hazards identification****Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

- Health hazards : Acute toxicity, Inhalation - Category 3 - Danger - (CLP : Acute Tox. 3) - H331  
Skin corrosion - Category 1B - Danger - (CLP : Skin Corr. 1B) - H314  
Corrosive to respiratory tract - (CLP : EUH071)
- Physical hazards : Flammable gases - Category 2 - Warning - (CLP : Flam. Gas 2) - H221  
Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280
- Environmental hazards : Hazardous to the aquatic environment - Acute hazard - Category 1 - Warning - (CLP : Aquatic Acute 1) - H400

**Classification EC 67/548 or EC 1999/45**

: R10  
T; R23  
C; R34  
N; R50

**Ammonia**
**ALSA002**
**SECTION 2. Hazards identification (continued)**
**Label elements**
**Labelling Regulation EC 1272/2008 (CLP)**

## • Hazard pictograms



## • Hazard pictograms code

: GHS06 - GHS05 - GHS04 - GHS09

## • Signal word

: Danger

## • Hazard statements

 : H331 - Toxic if inhaled.  
 H221 - Flammable gas.  
 H314 - Causes severe skin burns and eye damage.  
 H280 - Contains gas under pressure; may explode if heated.  
 H400 - Very toxic to aquatic life.

## • Supplemental hazard information

: EUH071 - Corrosive to respiratory tract.

## • Precautionary statements

## - Prevention

 : P260 - Do not breathe gas, vapours.  
 P280 - Wear protective gloves, protective clothing, eye protection, face protection.  
 P210 - Keep away from heat, sparks, open flames or hot surfaces. – No smoking.  
 P273 - Avoid release to the environment.

## - Response

 : 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.  
 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.  
 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 - Eliminate all ignition sources if safe to do so.

## - Storage

 : P405 - Store locked up.  
 P403 - Store in a well-ventilated place.

**Other hazards**

: None.

**SECTION 3. Composition/information on ingredients**
**Substance / 3.2. Mixture**

Substance.

Substance name	Contents	CAS No	EC No	Index No	Registration no	Classification
Anhydrous ammonia	: 100 %	7664-41-7	231-635-3	007-001-00-5	*2	R10 T; R23 C; R34 N; R50 ----- Acute Tox. 3 (H331) Skin Corr. 1B (H314) EUH071 Flam. Gas 2 (H221) Liq. Gas (H280) Aquatic Acute 1 (H400)

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

\* 1: Listed in Annex IV / V REACH, exempted from registration.

\* 2: Registration deadline not expired.

\* 3: Registration not required: Substance manufactured or imported &lt; 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

**Ammonia****ALSA002****SECTION 4. First aid measures****Description of first aid measures**

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

**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.  
Refer to section 11.

**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. Fire-fighting measures****Extinguishing media**

- Suitable extinguishing media : All known extinguishants can be used.

**Special hazards arising from the substance or mixture**

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition : Nitric oxide/nitrogen dioxide.

**Advice for fire-fighters**

- Specific methods : If possible, stop flow of product.  
Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
- Special protective equipment for fire fighters : Use self-contained breathing apparatus and chemically protective clothing.

**SECTION 6. Accidental release measures****Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.  
Monitor concentration of released product.  
Evacuate area.  
Ensure adequate air ventilation.  
Use self-contained breathing apparatus and chemically protective clothing.

**Environmental precautions**

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

**Methods and material for containment and cleaning up**

- : Ventilate area.  
Wash contaminated equipment or sites of leaks with copious quantities of water.  
Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost).  
Hose down area with water.

**Reference to other sections**

- : See also sections 8 and 13.

**Ammonia****ALSA002****SECTION 7. Handling and storage****Precautions for safe handling****Safe use of the product**

: Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.  
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.  
Avoid exposure, obtain special instructions before use.  
Keep away from ignition sources (including static discharges).  
Take precautionary measures against static discharge.  
Do not smoke while handling product.  
Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment.  
Consider the use only non-sparking tools.  
Ensure the complete gas system was (or is regularly) checked for leaks before use.  
Installation of a cross purge assembly between the cylinder 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.

**Safe handling of the gas receptacle**

: Refer to supplier's container handling instructions.  
Do not allow backfeed into the container.  
Protect cylinders 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 cylinder 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 cylinder contents.

**Conditions for safe storage, including any incompatibilities**

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

**Specific end use(s)**

: None.

**Ammonia****ALSA002****SECTION 8. Exposure controls/personal protection****Control parameters****Occupational Exposure Limits**

**Anhydrous ammonia** : ILV (EU) - 8 H - [mg/m<sup>3</sup>] : 14  
: ILV (EU) - 8 H - [ppm] : 20  
: ILV (EU) - 15 min - [mg/m<sup>3</sup>] : 36  
: ILV (EU) - 15 min - [ppm] : 50  
: TLV<sup>©</sup> -TWA [ppm] : 25  
: TLV<sup>©</sup> -STEL [ppm] : 35

**DNEL: Derived no effect level** : None available.

**PNEC: Predicted no effect concentration** : None available.

**Exposure controls**

**Appropriate engineering controls** : Product to be handled in a closed system.  
Preferably use only permanent leak-tight installations (e.g. welded pipes).  
Systems under pressure should be regularly checked for leakages.  
Provide adequate general and local exhaust ventilation.  
Consider work permit system e.g. for maintenance activities.  
Ensure exposure is below occupational exposure limits (where available).  
Alarm detectors should be used when toxic gases may be released.

**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.  
Keep self contained breathing apparatus readily available for emergency use.  
Keep suitable chemically resistant protective clothing readily available for emergency use.  
Protect eyes, face and skin from liquid splashes.  
Wear leather safety gloves and safety shoes when handling cylinders.  
Wear goggles and a face shield when transfilling or breaking transfer connections

**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****Information on basic physical and chemical properties****Appearance**

**- Physical state at 20°C / 101.3kPa** : Gas.  
**- Colour** : Colourless.  
**Odour** : Ammoniacal.  
**Odour threshold** : Odour threshold is subjective and inadequate to warn for overexposure.  
**pH value** : If dissolved in water pH-value will be affected.  
**Molar mass [g/mol]** : 17  
**Melting point [°C]** : -77.7  
**Boiling point [°C]** : -33  
**Critical temperature [°C]** : 132  
**Flash point [°C]** : Not applicable for gases and gas-mixtures.  
**Evaporation rate (ether=1)** : Not applicable for gases and gas-mixtures.  
**Flammability range [vol% in air]** : 15.4 to 33.6  
**Vapour pressure [20°C]** : 8.6 bar  
**Relative density, gas (air=1)** : 0.6  
**Relative density, liquid (water=1)** : 0.7  
**Solubility in water [mg/l]** : Completely soluble.  
**Partition coefficient n-octanol/water** : Not applicable for inorganic gases.  
**Auto-ignition temperature [°C]** : 630

**Ammonia****ALSA002****SECTION 9. Physical and chemical properties (continued)****Other information**

Other data : None.

**SECTION 10. Stability and reactivity****Reactivity**

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

**Chemical stability**

: Stable under normal conditions.

**Possibility of hazardous reactions**: Can form explosive mixture with air.  
May react violently with oxidants.**Conditions to avoid**

: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

**Incompatible materials**: Air, Oxidiser.  
May react violently with acids.  
Reacts with water to form corrosive alkalis.  
For additional information on compatibility refer to ISO 11114**Hazardous decomposition products**

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

**SECTION 11. Toxicological information****Information on toxicological effects**

**Acute toxicity** : Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudomembrane formation.

**Rat inhalation LC50 [ppm/4h]** : 2000

**Skin corrosion/irritation** : May cause inflammation of the skin.

**Serious eye damage/irritation** : Irritation to eyes.

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

**Carcinogenicity** : No known effects from this product.

**Germ cell mutagenicity** : No known effects from this product.

**Reproductive toxicity** : No known effects from this product.

**STOT-single exposure** : May cause inflammation of the respiratory system.

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

**Aspiration hazard** : Not applicable for gases and gas-mixtures.

**Ammonia****ALSA002****SECTION 12. Ecological information****Toxicity**

: Very toxic to aquatic life.  
48 Hour-EC50 - Daphnia magna [mg/l] : 25.4  
IC50 72h Algae [mg/l] : No data available.  
LC50-96 Hour - fish [mg/l] : 0.16 - 3.4

**Persistence - degradability**

: No data available.

**Bioaccumulative potential**

: No data available.

**Mobility in soil**

: No data available.

**Results of PBT and vPvB assessment**

: No data available.

**Other adverse effects**

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

**SECTION 13. Disposal considerations****Waste treatment methods**

: Gas may be scrubbed in sulphuric acid solution.  
Gas may be scrubbed in water.  
Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere.  
Must not be discharged to atmosphere.  
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods

**Additional information**

: None.

**SECTION 14. Transport information**

UN number : 1005  
Labelling ADR, IMDG, IATA



: 8 : Corrosive substance.  
2.3 : Toxic gas.  
Environmentally hazardous substance.

**Land transport (ADR/RID)**

H.I. nr : 268  
UN proper shipping name : AMMONIA, ANHYDROUS  
Transport hazard class(es) : 2  
Classification code : 2 TC  
Packing Instruction(s) : P200

**Ammonia****ALSA002****SECTION 14. Transport information (continued)**

**Tunnel Restriction** : C/D : Passage forbidden through tunnels of category C when carried in tanks. Passage forbidden through tunnels of category D and E.

**Environmental hazards** : None.

**Sea transport (IMDG)**

**Proper shipping name** : AMMONIA, ANHYDROUS

**Class** : 2.3

**Packing group** : P200

**Emergency Schedule (EmS) - Fire** : F-C

**Emergency Schedule (EmS) - Spillage** : S-U

**Packing instruction** : P200

**Air transport (ICAO-TI / IATA-DGR)**

**Proper shipping name (IATA)** : AMMONIA, ANHYDROUS

**Class** : 2.3

**Passenger and Cargo Aircraft** : DO NOT LOAD IN PASSENGER AIRCRAFT.

**Cargo Aircraft only** : FORBIDDEN.

**Special precautions for user**

: 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 that containers are firmly secured.  
- Ensure cylinder 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.  
- Ensure there is adequate ventilation.

**SECTION 15. Regulatory information****Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

**Restrictions on use** : None.

**Seveso directive 96/82/EC** : Listed

**National legislation**

: Ensure all national/local regulations are observed.

**Chemical Safety Assessment**

: A Chemical safety assessment (CSA) has been carried out for this product.

**SECTION 16. Other information**

**Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010

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

**List of full text of R-phrases in section 3.** : R10 : Flammable.  
R23 : Toxic by inhalation.  
R34 : Causes burns.  
R50 : Very toxic to aquatic organisms.

**List of full text of H-statements in section 3.** : EUH071 - Corrosive to respiratory tract.  
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.





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## Ammonia

### ALSA002

#### SECTION 16. Other information (continued)

- Note** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- DISCLAIMER OF LIABILITY** : 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. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

**End of document**