Section 1. Identification of the substance/mixture and of the Company

Product Name: Ammonia
Chemical formula: NH_3
Uses: Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas.
Laboratory use.
Chemical reaction / Synthesis.
Use as refrigerant. Contact supplier for more information on uses.

Company Identification:
Gaz Carbonique Limitée
Lot 1, Ground Floor, Le Hub,
DBM Industrial Zone, Phoenix
Mauritius - Indian Ocean
Tel: (230) 603 2992
Fax: (230) 696 5973
Email: contact@gazcarbo.mu

Contact Person:
Mr. Arnaud Rougier Lagane
Chief Operating Manager

Section 2. Hazards Identification

Classification of the substance or mixture

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 1B	H314
	Serious eye damage/eye irritation, Category 1	H318
Environmental hazards	Hazardous to the aquatic environment — Acute Hazard, Category 1	H400

Label Elements
Hazard Pictograms

Hazard pictograms code: GHS04 GHS05 GHS06 GHS09
Signal word: Danger
Hazard Statement: H221 - Flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H331 - Toxic if inhaled.
H400 - Very toxic to aquatic life.
H314 - Causes severe skin burns and eye damage.
EUH071 - Corrosive to the respiratory tract.

Precautionary Statements
-Prevention : P273 - Avoid release to the environment.
P260 - Do not breathe gas, vapours.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Response : P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
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 -

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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. –

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

Other Hazards: None

Section 3. Composition/Information on Ingredients

Chemical Name:	Ammonia, anhydrous
CAS NO.:	7664-41-7
EC Index-Nr.:	007-001-00-5
EC No:	231-635-3
REACH No:	01-2119488876-14

Section 4. 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. Prolonged exposure to small concentrations may result in pulmonary oedema. Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

Section 5. Fire Fighting Measures

Special extinguishing media
- Suitable extinguishing media: Water spray or fog
Carbon Dioxide
Foam
-Unsuitable extinguishing media: Do not use water jet to extinguish

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.
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 reignition 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

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Wear gas tight chemically protective clothing in combination with self-contained breathing apparatus.
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

Personal precautions, protective equipment and emergency procedures
Try to stop release.
Evacuate area.
Monitor concentration of released product.
Wear gas tight chemically protective clothing in combination with self-contained breathing apparatus.
Ensure adequate air ventilation.
Act in accordance with local emergency plan.
Stay upwind.

Section 6. Accidental Release Measures (continued)

Environmental precautions
Try to stop release. Reduce vapour with fog or fine water spray.
Clean up methods
Hose down area with water. Ventilate area. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost). Wash contaminated equipment or sites of leaks with copious quantities of water.

Section 7. Handling and Storage

Safe Use of the product
The substance 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 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. Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment. Take precautionary measures against static discharge. Keep away from ignition sources (including static discharges). Consider the use of only non-sparking tools. Do not breathe gas. Avoid release of product into atmosphere.

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
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

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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.

Section 8. Exposure Controls/Personal Protection

Exposure controls

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below occupational exposure limits. Gas detectors should be used when toxic quantities may be released. Gas detectors should be used when quantities of flammable gases or vapours may be released. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system and under strictly controlled conditions. Use only permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges. Do not eat, drink or smoke when using the product.

Personal protection

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. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Protect eyes, face and skin from contact with product. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Eye/face protection: Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

Skin protection: Hand Protection: Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks. Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Material: Chloroprene rubber. Break-through time: 30 min Glove thickness: 0.5 mm Guideline: EN 374-1/2/3 Protective gloves against chemicals and microorganisms. Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Material: Butyl rubber. Break-through time: 480 min Glove thickness: 0.7 mm Guideline: EN 374-1/2/3 Protective gloves against chemicals and microorganisms

Body protection: Wear fire/flame resistant/retardant clothing. Keep suitable chemically resistant protective clothing readily available for emergency use. Guideline: ISO/TR 2801:2007 Clothing for protection against heat and flame -- General recommendations for selection, care and use of protective clothing.Guideline: EN 943 Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles.

Other: Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear

Respiratory protection: Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Material: Filter K Guideline: EN 14387 Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking. Guideline: EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking.

Thermal hazards: No precautionary measures are necessary

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Hygiene measures: Obtain special instructions before use. Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product

Environmental exposure controls
For waste disposal, see section 13.

Section 9. Physical and Chemical Properties

General Information
Appearance

• Physical state at 20°C / 101.3kPa	: Gas.
• Colour	: Colourless.
Odour	: Ammoniacal.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH value	: If dissolved in water pH-value will be affected.
Molar mass	: 17 g/mol
Melting point	: -77.7 °C
Boiling point	: -33 °C
Flash point	: Not applicable for gases and gas mixtures.
Critical temperature [°C]	: 132 °C
Evaporation rate (ether=1)	: Not applicable for gases and gas mixtures.
Flammability range	: 15.4 - 33.6 vol %
Vapour pressure [20°C]	: 8.6 bar(a)
Vapour pressure [50°C]	: 20 bar(a)
Relative density, gas (air=1)	: 0.6
Relative density, liquid (water=1)	: 0.7
Solubility in water	: 517000 mg/l
Partition coefficient n-octanol/water [log Kow]	: Not applicable for inorganic gases.
Auto-ignition temperature	: 630 °C
Viscosity [20°C]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: 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
May react violently with oxidants. Can form explosive mixture with air..
Conditions to avoid
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Incompatible materials
Reacts with water to form corrosive alkalis. May react violently with acids. Air, Oxidiser. 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

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Acute toxicity :	Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudomembrane formation.
LC50 inhalation rat (ppm)	: 2000 ppm/4h
Skin corrosion/irritation	: May cause inflammation of the skin. S
erious eye damage/irritation	: Irritation to eyes.
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	: May cause inflammation of the respiratory system.
Target organ(s)	: Respiratory tract.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas mixtures.

Section 12. Ecological Information

Toxicity	: Very toxic to aquatic life.
Persistence and degradability	: The substance is biodegradable. Unlikely to persist
Bio accumulative potential	: Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Mobility in soil	: Because of its high volatility, the product is unlikely to cause ground or water pollution.
Results of PBT and vPvB assessment	: Not classified as PBT or vPvB.

Other adverse effects

May cause pH changes in aqueous ecological systems.

-**Effect on ozone layer:** None

-**Effect on the global warning:** No know effects from this product.

Section 13. Disposal Considerations

Waste treatment methods

Must not be discharged to atmosphere. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Gas may be scrubbed in sulphuric acid solution. Gas may be scrubbed in water. 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.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

Additional information

None.

Section 14. Transport Information

UN Number:	1005
UN Proper Shipping Name:	AMMONIA, ANHYDROUS

Labelling ADR, IMDG, IATA:

2.3 : Toxic gases
8 : Corrosive substances
Environmentally hazardous substances

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Road/Rail Transport (ADG)

Class:	2
Hazchem code:	2RE
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

Air Transport (IATA-DGR, ICAO-TI)

Class / Div. (Sub.risk(s)):	2.3 (8)

Sea Transport (IMDG)

Class / Div. (Sub.risk(s)):	2.3 (8)
Emergency Schedule (EmS) Fire:	F-C
Emergency Schedule (EmS) Spillage:	S-U
Packing Group:	Not applicable
Environmental Hazards:	Environmentally Hazardous

Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID)	P200
Air Transport (IATA-DGR / ICAO-TI)	
Passenger and Cargo Aircraft:	Forbidden
Cargo Aircraft only:	Forbidden
Sea Transport (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 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

HAZCHEMCODE 2RE

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable.

Section 15. Regulatory Information

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

Section 16. Other Information

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

Full text of H-phrases:

H314	Causes severe skin burns and eye damage
H331	Toxic if inhaled
H332	Harmful if inhaled
H400	Very toxic to aquatic life

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