1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Trade name/designation:	Ammonia
CAS No.:	7664-4-41-7
Product type:	Liquid Ammonia, Anhydrous
Molecular formula:	NH_3
Molecular weight:	17.03 g/mol

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

Relevant identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Brunei Fertilizer Industries Sdn Bhd

Company address	Level 2, SPARK Centre, Sungai Liang Industrial Park, Simpang 787, Kg Sungai Liang, Belait KC1135, Brunei Darussalam
Telephone	+673 32300 40/41/97
E-mail	bfimarketing@bfi.com.bn

Emergency telephone

Telephone	+673 32300 40/41/97 +673 7172420

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

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

Flammable gases, (Category 2)	H221: Flammable gas
Gases under pressure, (Liquefied gas)	H280: Contains gas under pressure; may explode if heated.
Acute toxicity, (Category 3)	H331: Toxic if inhaled
Skin corrosion, (Sub-category 1B)	H314: Causes severe skin burns and eye damage
Serious eye damage, (Category 1)	H318: Causes serious eye damage
Short-term (acute) aquatic hazard, (Category 1)	H400: Very toxic to aquatic life
Long-term (chronic) aquatic hazard, (Category 2)	H411: Toxic to aquatic life with long lasting effects

2.2 Label elements

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

Hazards Pictograms (GHS):

Signal word:

Danger

Hazardous Statement:

H290	May be corrosive to metals
H314	Causes severe skin burns and eye damage
H335	May cause respiratory irritation
H410	Very toxic to aquatic life with long lasting effects
H280	Contains gas under pressure; may explode if heated

Precautions Statement:

Precautionary statements – prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
P260	Do not breathe gas
P273	Avoid release to the environment
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection
P403 + P233	Store in a well-ventilated place. Keep container tightly closed
P410 + P403	Protect from sunlight. Store in a well-ventilated place

Precautionary statements - response

P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310	Immediately call a Poison Centre/doctor

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	Typical weight percentage
Ammonia	7664-4-41-7	99.75 – 99.8 % wt
Water Content	733-18-5	0.20 – 0.25 % wt
Oil Content	115-86-6	5 Max. ppm wt
Iron Content	7439-89-6	1.2 Max. ppm wt

4. FIRST AID MEASURES

4.1 General information

The chemical is toxic. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the “buddy” system). Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

After inhalation

Remove source of contamination or move casualty to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow casualty to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED) immediately. Avoid mouth-to-mouth contact by using mouth guards or shields. Quickly transport victim to an emergency care facility.

In case of skin contact

Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. If irritation persists, repeat flushing. DO NOT INTERRUPT FLUSHING. If necessary and it can be done safely, continue flushing during transport to emergency care facility. Quickly transport victim to an emergency care facility. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal. NOTE: Any skin contact will also involve significant inhalation exposure.

After eye contact

To be filled in Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto the face. Quickly transport casualty to an emergency care facility.

NOTE: Any eye contact will also involve significant inhalation exposure.

In case of ingestion

To be filled in NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have casualty rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have casualty rinse mouth with water again. Quickly transport casualty to an emergency care facility.

4.2 Most important symptoms and effects, both acute and delayed

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. Inhalation of chemical is toxic. Contact with eye and skin may cause serious eye damage and severe skin burns. Harmful if swallowed.

4.3 Indication of any immediate medical attention and special treatment needed

No additional information available.

4.4 Self-protection of the first aider

Use protective clothing before contact with casualty.

4.5 Information to physician

After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed. Following severe exposure, the casualty should be kept under medical supervision for at least 48 hours. Effects may be delayed. Provide general supportive measures (comfort, warmth, rest). Treat symptomatically. Can cause corneal burns

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Co-ordinate firefighting measures to the fire surroundings water spray, alcohol resistant foam, dry extinguishing powder.

Extinguishing media which must not be used for safety reasons

water jet

5.2 Special hazards arising from the substance or mixture

Vapours may form explosive mixtures with air. The product itself does not burn.

Hazardous combustion products

In case of fire may be liberated: Nitrogen oxides (NOx)

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Do not allow firefighting water to enter

drains or water courses. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus. Wear full chemical protective clothing.

5.4 Additional information

No Information.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe gas. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult and expert. For personal protection see section 8.

6.2 Environmental precautions

Avoid spillage enter drains or public sewers.

6.3 Methods and material for containment and cleaning up

Small spill:

For containment: Contain the spillage to prevent entry into drain.

Method of cleaning up: Cover it with sand, earth or appropriate absorbent material to soak up the spillage. Use only non- sparking tools. Transfer spilled materials into a suitable container for disposal.

Large spill:

For containment: Contain the spillage to prevent entry into drain. Stop leak if without risk.

Method of cleaning up: Immediately contact Emergency Response Team personnel or national Emergency Response services.

6.4 Additional information

No information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin, eyes and clothing. Do not breathe vapor or mist. Use appropriate personal protection equipment.

Advice on general occupational hygiene

Wash hands before breaks and after work. Keep away from food, drink and animal feeding stuffs.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed.

Recommended storage temperature for **Cold Ammonia** is -33°C at atmospheric pressure.

Recommended storage temperature for **warm Ammonia** is 15-30°C at minimum 13.5 Barg.

7.3 Specific end use(s)

No information available.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure controls

8.1.1 Workplace Exposure Limits (WEL)

OSHA: Permissible Exposure Limit (PEL) – 50 ppm (8hr TWA)

NIOSH: Recommended Exposure Limit (REL) – 25ppm (10 hr TWA), 35ppm STEL

ACGIH: Threshold Limit Value (TLV) – 25ppm (8 hr TWA), 35ppm (STEL)

8.1.2 Appropriate engineering controls

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

8.1.3 Personal protection equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate standards. Tightly fitting safety goggles. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemicals products if a risk assessment indicates this is necessary.

Body protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing.

Respiratory protection

Based on the hazard and potential for exposure, select a respirator that meets the appropriate standards or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training and other important aspects of use.

Additional information

8.1.4 Environmental exposure controls

Avoid spillage enter drains or public sewers. Contact national emergency response services or authorities to get advice if significant spillages cannot be contained.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

(a) Appearance

Physical state:	Ammonia - Liquid
Colour:	Colorless
Odour:	Pungent. Do not attempt to smell the product as it is hazardous
Odour threshold:	25 ppm.

9.2 Safety relevant basic data

(a) pH:	Approx. 11.6
(b) Melting point/freezing point:	-78°C - lit
(c) Initial boiling point and boiling range:	- 33°C
(d) Flash point	Not Available
(e) Evaporation rate:	Not Available
(f) Flammability (solid, gas):	Flammable
(g) Flammability or explosive Limits	
Lower explosion limit:	Lower explosion limit: 16% (V)
Upper explosion limit:	Upper explosion limit: 25% (V)
(h) Vapour pressure:	8600 hPa at 20°C
(i) Relative density:	0.68 g/cm^3 at -33°C – liquid 0.60 g/cm^3 at 30°C – liquid
(j) Solubility(ies)	
Water solubility (g/L):	531 g/l at 20°C
Soluble (g/L) in Ethanol:	No data available
(k) Partition coefficient: n-octanol/water:	Not applicable for inorganic substances
(l) Auto-ignition temperature:	651°C
(m) Decomposition temperature:	>450 °C
(n) Kinematic Viscosity	No data available
(o) Dynamic viscosity	0.254 mPa.s at - 33°C
(p) Explosive properties:	No data available
(q) Oxidising properties:	None

9.3 Other information

Dissociation constant:	9.25 at 25°C
Surface tension:	No data available
Henry constant:	No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No reaction with air at ambient temperature. Reaction with water can produce Ammonium hydroxide.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure

10.3 Possibility of hazardous reactions

Exothermic reaction with:

Acetaldehyde, Acrolein, boron triiodide, boron trifluoride, Bromine, hydrogen bromide, Hydrogen chloride gas, chromyl chloride, dimethylsulfate, nitrogen oxides, Hydrogen fluoride, Carbon dioxide (CO_2), mercaptans, chlorates, nitryl compounds, Phosgene, Oxides of phosphorus, Acids, hydrogen sulphide, sulphur dioxide, chromium(VI) oxide, metal catalysts, Barium, halogen-halogen compounds, halogen compounds, hypochlorous acid, phosphorus hydrogen, tetra methylammonium amide, propinyl chloride, Ethylene oxide, polymerization.

A risk of explosion and/or of toxic gas formation exists with the following substances:

Ammonium salts, antimony hydride, Calcium, Chlorine, Chlorites, Fluorine, halogens, perchlorates, sodium hypochlorite, strong oxidising agents, Mercury, mercury compounds, sulfur, silver, silver salt, silver oxide, hydrogen peroxide, nitrogen trichloride, azides, halogen oxides, Nitro compounds, chlorinated solvents, Hydrocarbons with Air, oxygen with catalyst.

Risk of ignition or formation of inflammable gases or vapours with:

Boron

10.4 Conditions to avoid

Keep away from heat. Exposure to direct sunlight. Mix with water.

10.5 Incompatible materials

Copper and mercury.

10.6 Hazardous decomposition products

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

10.7 Additional information

No information available.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute effects

No adverse effect expected if the chemical is handled in accordance with this safety data sheet. Symptoms or effects that may arise if the chemical is mishandled and overexposure occurs are:

Inhalation – Breathing in mists or aerosols will produce respiratory irritation. Inhalation of high concentrations may result in shortness in breath, chest pain, severe headache and lung damage including pulmonary oedema.

Eye contact – Causes serious eye damage

Skin contact – Causes severe burns

Ingestion – Can burn mouth, throat and stomach. Harmful if swallowed.

Irritant and corrosive effects

No data available

Respiratory or skin sensitisation

No data available

STOT-single exposure

May cause respiratory irritation. Classification is based on mixture calculation methods based on component data.

STOT-repeated exposure

No data available

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction) Carcinogenicity

Not listed as carcinogenic according to International Agency for Research on Cancer (IARC)

Germ cell mutagenicity

No data available

Reproductive toxicity

No data available

Aspiration hazard

No data available

Other adverse effects

No data available

Additional information

No data available

Chronic Exposure:
No data available

Aggravation of Pre-existing Conditions:
No data available

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity
Avoid contaminating waterways. Very toxic to aquatic life.

12.2 Persistence and degradability
Biodegradable

12.3 Bioaccumulative potential
Substance/mixture does not bioaccumulate

12.4 Mobility in soil:
No data available

12.5 Results of PBT/vPvB assessment
This substance/mixture contains no components considered to be either persistent, bio accumulative and toxic (PBT), or very persistent and very bio accumulative (vPvB).

12.6 Environmental Fate
No information

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Appropriate disposal / Product
Handle container that has content or residual with care. Avoid release to the environment. Dispose of content shall be in accordance with local, national and/or international regulations.

Appropriate disposal / Package
Empty containers should be taken to an approved waste handling site for recycling or disposal to approved landfill.

Additional information
Avoid release to the environment.

14. TRANSPORT INFORMATION

Land transport: Australian Dangerous Goods (ADG) Code

UN number	1005
Proper Shipping name	AMMONIA (ANHYDROUS)
Hazard class	2.3
UN Packing group	III
Hazchem code	2X

Sea transport: International Maritime Dangerous Goods (IMDG) Code

UN number	1005
Proper Shipping name	AMMONIA (ANHYDROUS)
Hazard class	2.3
UN Packing group	III
IMDG EMS Fire	F-A
IMDG EMS Spill	S-B

Air transport: International Air Transport (IATA) Dangerous Good Regulations

UN number	1005
Proper Shipping name	AMMONIA (ANHYDROUS)
Hazard class	2.3
UN Packing group	III

15. REGULATORY INFORMATION

International regulations

- Safety, health and environmental regulations/legislation specific for the substances or mixture relevant provision of the Europen Union (EU)
- Registration, Evaluation, Authorisation and Restriction of Chemicals Regulations
- Classification, Labelling and Packaging Regulations
- European Inventory of Existing Commercial chemical substances

National regulations (Brunei Darussalam)

- Workplace Safety and Health (General Provisions) Regulations
- Workplace Safety and Health Act, Chapter 277: Toxic Substances are listed as Hazardous Substances
- Workplace Safety and Health (Facilities) (Control of Major Accident Hazards) Regulations: Hazardous substancespecified in Division 2 of Part II of the Fifth Schedule to the act
- Environmental Protection and Management Act, Chapter 240
- Merchant Shipping Order, 2002
- Prevention of Pollution of the Sea Order, 2005

15.1 Chemical Safety Assessment
No information

16. OTHER INFORMATION

Abbreviations and acronyms

PBT: Persistent, bio accumulative and toxic
VPvB: Very persistent and Very bio accumulative
OSHA: Occupational Safety and Health Administration.
NIOSH: National Institute for Occupational Safety and Health.
ACGIH: American Conference of Governmental Industrial Hygienists.
ADG: Australian Dangerous Goods
IMDG: International Maritime Dangerous Goods
IATA: International Air Transport
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals

Additional information
No additional information

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