

SAFETY DATA SHEET



Revision date: 13-Oct-2021

Revision Number 6

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product identifier

Product Name AMMONIA - ANHYDROUS

Product Code(s) 000031098301

Other means of identification

Proper shipping name AMMONIA, ANHYDROUS

UN number 1005

CAS No. 7664-41-7

Synonyms Ammonia anhydrous; Ammonia gas; Anhydrous ammonia; Ammonia liquid; Big N; Ammonia cylinder (used).

Pure substance/mixture Substance

Formula NH₃

Recommended use of the chemical and restrictions on use

Recommended use Fertilizer, preparation of fertilizers, refrigerant, chemical synthesis, manufacturing chemical.

Uses advised against No information available.

Supplier

Ixom Operations Pty Ltd
ABN: 51 600 546 512
Level 8, 1 Nicholson Street
Melbourne 3000
Australia

Telephone Number: +61 3 9906 3000

Emergency telephone number

Emergency telephone number **1 800 033 111 (ALL HOURS)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

GHS Classification

Classified as dangerous goods in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG).

Classified as a hazardous chemical in accordance with the criteria of Safe Work Australia - Globally Harmonized System (GHS).

Flammable gases	Category 2
Gases under pressure	Liquefied gas
Acute toxicity - Oral	Category 4
Acute toxicity - Inhalation (Gases)	Category 3
Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Acute aquatic toxicity	Category 1

SIGNAL WORD

Danger

Label elements**Hazard statements**

H221 - Flammable gas
H280 - Contains gas under pressure; may explode if heated
H302 - Harmful if swallowed
H314 - Causes severe skin burns and eye damage
H331 - Toxic if inhaled
H400 - Very toxic to aquatic life

Precautionary Statements - Prevention

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Do not breathe mist, vapours, spray.
Wash hands thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Wear protective gloves / protective clothing / eye protection / face protection
Avoid release to the environment

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician
Specific treatment (see First aid on this SDS)
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF ON SKIN (or hair):
Remove/Take off immediately all contaminated clothing
Rinse skin with water/shower
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
Leaking gas fire: Do not extinguish, unless leak can be stopped safely
Eliminate all ignition sources if safe to do so
Collect spillage

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up
Protect from sunlight

Precautionary Statements - Disposal

Dispose of contents/container in accordance with local, regional, national, and international regulations as applicable

Other hazards which do not result in classification

AUH071 - Corrosive to the respiratory tract

General Hazards

Poisons Schedule (SUSMP)

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3. COMPOSITION/INFORMATION ON INGREDIENTS**Substance**

Chemical name	CAS No.	Weight-%
Ammonia	7664-41-7	>99.5
Impurities	-	to 100

4. FIRST AID MEASURES**Description of first aid measures**

General advice	Immediate medical attention is required. Take a copy of the Safety Data Sheet when going for medical treatment. For advice, contact a Poisons Information Centre (e.g. phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.
Emergency telephone number	Poisons Information Center, Australia: 13 11 26 Poisons Information Center, New Zealand: 0800 764 766
Inhalation	Remove to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, (trained personnel should) give oxygen. Immediately give oxygen if victim turns blue (lips, ears, fingernails). If breathing has stopped, give artificial respiration. Get medical attention immediately.
Eye contact	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Call a physician immediately.
Skin contact	Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention/advice. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing. Caution - material can be very cold. For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. Clothing frozen to the skin should be thawed before being removed. Call a physician immediately.
Ingestion	Call a physician immediately. Rinse mouth thoroughly with water. Not an expected route of exposure.
Self-protection of the first aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes, and clothing.
<u>Most important symptoms and effects, both acute and delayed</u>	
Symptoms	Difficulty in breathing. Coughing and/ or wheezing. Burning sensation. Irritating. May cause redness and tearing of the eyes. Erythema (skin redness). Contact with very cold material can cause freeze burns.
<u>Indication of any immediate medical attention and special treatment needed</u>	
Note to physicians	Treat symptomatically. Material may be very cold and may cause freeze burns. Delayed pulmonary edema may occur. Can cause corneal burns. Can act as an asphyxiant.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Suitable Extinguishing Media Water spray or fog. Foam. Dry chemical or CO₂. Water spray can be used to bring down vapour but should not be used on pools of liquid ammonia. Ammonia solutions are alkaline.

Small Fire Water spray or fog. Dry chemical or CO₂.

Large Fire Water spray or fog.

Unsuitable extinguishing media No information available.

Specific hazards arising from the chemical

Specific hazards arising from the chemical May form flammable vapour mixtures with air. May form explosive mixtures with air. May be ignited by heat, sparks or flames. All potential sources of ignition (open flames, pilot lights, furnaces, spark producing switches and electrical equipment etc) must be eliminated both in and near the work area. Do NOT smoke. Flameproof equipment is necessary in all areas where this chemical is being used. Nearby equipment must be earthed. Flammable concentrations of ammonia can accumulate in the vapour space of storage containers/vessels.

Hazardous combustion products Nitrogen oxides. Ammonia. Hydrogen.

Special protective actions for fire-fighters

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Vapors can form explosive mixtures with air. Fight fire remotely due to the risk of explosion. Fires to be fought from a protected location. Consider evacuation. Cool containers with flooding quantities of water until well after fire is out. Move containers from fire area if you can do it without risk. Do not direct water at source of leak or safety devices; icing may occur.

Hazchem code 2XE

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Ensure adequate ventilation. Avoid breathing vapors or mists. Use personal protective equipment as required. See section 8 for more information. Seek specialist advice. Avoid contact with skin, eyes and inhalation of vapors.

Other information Refer to protective measures listed in Sections 7 and 8.

For emergency responders Shut off ignition sources. Ventilate the area. Work up wind or increase ventilation. Use personal protection recommended in Section 8. Seek specialist advice.

Environmental precautions

Environmental precautions Should not be released into the environment. Local authorities should be advised if significant spillages cannot be contained. Prevent entry into waterways, sewers, basements or confined areas. Prevent product from entering drains. Keep out of waterways.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk.

Methods for cleaning up Work up wind or increase ventilation. This material is a liquefied gas.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling

Do not breathe vapor or mist. Avoid contact with skin, eyes, and clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect cylinders from physical damage; do not drag, roll, slide or drop. Contents under pressure. Use personal protection equipment. Keep out of reach of children.

Ammonia gas is generally lighter than air and will disperse under normal conditions. However, when ammonia liquid contacts air the gas produced may be heavier than air. Prevent concentration in hollows and sumps. DO NOT enter confined spaces where vapour may have collected. Ammonia can lead to a reduction of oxygen concentration by displacement or dilution. The minimum oxygen concentration in air should be 18% by volume under normal atmospheric pressure.

General hygiene considerations

Wear suitable gloves and eye/face protection. Avoid breathing vapors or mists. Wash hands before breaks and after work.

Conditions for safe storage, including any incompatibilities

Storage Conditions

Keep containers tightly closed in a cool, well-ventilated place. Check cylinders regularly for leaks. Store away from foodstuffs and sources of heat or ignition.

This material is a Scheduled Poison and must be stored, maintained and used in accordance with the relevant regulations.

Packaging materials

The transport of liquefied ammonia in a tank or bulk container made of quenched and tempered steel is prohibited unless the liquefied ammonia contains not less than 0.2% water mass. Ensure pressure gauges and fittings are not made of copper, zinc or alloys (eg brass). Refer to AS/NZS 2022 Anhydrous ammonia - Storage and Handling.

Incompatible materials

Acids. Acid anhydrides. Acid chlorides. Halogens. Heavy metals. Heavy-metal compounds. Ethylene oxide. Boron. Chlorites. Chlorates. Silver. Sulfur. Oxidizing agents.

Poisons Schedule (SUSMP)

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits

Ammonia: 8hr TWA = 17 mg/m³ (25 ppm), 15 min STEL = 24 mg/m³ (35 ppm)

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls

Engineering controls

Showers
Eyewash stations
Ventilation systems.
Apply technical measures to comply with the occupational exposure limits. Ensure adequate ventilation, especially in confined areas.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as personal protective equipment

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).



Eye/face protection

Face protection shield. Tight sealing safety goggles.

Skin and body protection

Wear suitable protective clothing. Chemical resistant apron. Overalls. Protective shoes or boots.

Hand protection

Impervious gloves.

Respiratory protection

If determined by a risk assessment an inhalation risk exists, wear an air supplied respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.

Environmental exposure controls

No information available.

Thermal hazards

Caution - material can be very cold.
Avoid contact with escaping gas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Compressed liquefied gas
Appearance	No information available.
Color	Colourless
Odor	Intensely irritating ammoniacal odour. Pungent
Odor threshold	5-53 ppm

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	No data available	None known
pH (as aqueous solution)	No data available	None known

Melting point / freezing point	-77.7 C	None known
Boiling point / boiling range	-33.4 C	None known
Flash point	Not available	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	28%	
Lower flammability or explosive limits	15%	
Vapor pressure	960 kPa @ 25C	None known
Vapor density	0.6	None known
Relative density	0.68 (-33C)	None known
Water solubility	Soluble in water	None known
Solubility(ies)	Soluble in ether and Alcohol	None known
Partition coefficient	No data available	None known
Autoignition temperature	651 C	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	0.266cP @ -34 C	None known
Dynamic viscosity	No data available	None known
Other information		
VOC Content (%)	100	
Molecular formula	NH3	

10. STABILITY AND REACTIVITY

Reactivity

Reactivity Reacts violently with acids. Hygroscopic.

Chemical stability

Stability Stable under recommended storage conditions. Dissolves exothermically in water. Hygroscopic.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge No information available.

Possibility of hazardous reactions

Possibility of hazardous reactions Corrosive to copper, zinc and their alloys. Can react explosively with chlorine, hypochlorites or other strong oxidising agents.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid

Conditions to avoid Keep away from open flames, hot surfaces and sources of ignition. Loss of containment.

Incompatible materials

Incompatible materials Acids. Acid anhydrides. Acid chlorides. Halogens. Heavy metals. Heavy-metal compounds. Ethylene oxide. Boron. Chlorites. Chlorates. Silver. Sulfur. Oxidizing agents.

Hazardous decomposition products

Hazardous decomposition products Nitrogen oxides. Ammonia. Hydrogen.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Information on likely routes of exposure

Product Information	No adverse health effects expected if the chemical is handled in accordance with this Safety Data Sheet and the chemical label. Symptoms or effects that may arise if the chemical is mishandled and overexposure occurs are:
Inhalation	Toxic if inhaled. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Large exposures may be fatal. In high concentration the gas may cause a suffocation. Victim may not be aware of asphyxiation.
Eye contact	Severely irritating to eyes. Causes burns. Corrosive to the eyes and may cause severe damage including blindness. When cold: Contact with product may cause frostbite. Can result in permanent injury.
Skin contact	Contact causes severe skin irritation and possible burns. Caution - material can be very cold. Contact with product may cause frostbite.
Ingestion	Not an expected route of exposure. Can burn mouth, throat, and stomach.
Symptoms	Irritation/Corrosion. Burning. May cause redness and tearing of the eyes. Coughing and/ or wheezing. May cause blindness. Difficulty in breathing. Erythema (skin redness).

Numerical measures of toxicity - Product Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Ammonia	= 350 mg/kg (Rat)	-	= 2000 ppm (Rat) 4 h

See section 16 for terms and abbreviations

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	Causes severe burns.
Serious eye damage/eye irritation	Causes burns. Causes serious eye damage.
Respiratory or skin sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	No information available.
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Aspiration hazard	No information available.
Chronic effects:	Chronic exposure to ammonia may cause chemical pneumonitis and other lung effects.

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Ecotoxicity Keep out of waterways. Component (ammonia) is very toxic to aquatic life.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Ammonia	-	LC50: =0.44mg/L (96h, Cyprinus carpio) LC50: 0.26 - 4.6mg/L (96h, Lepomis macrochirus) LC50: =1.17mg/L (96h, Lepomis macrochirus) LC50: 0.73 - 2.35mg/L (96h, Pimephales promelas) LC50: =5.9mg/L (96h, Pimephales promelas) LC50: >1.5mg/L (96h, Poecilia reticulata) LC50: =1.19mg/L (96h, Poecilia reticulata)	-	LC50: =25.4mg/L (48h, Daphnia magna)

Persistence and degradability

Persistence and degradability Ammonia is readily oxidised to nitrate, which is also toxic to fish.

Bioaccumulative potential

Bioaccumulation Bioaccumulation is not expected.

Chemical name	Partition coefficient
Ammonia	-1.14

Mobility

Mobility in soil After release, disperses into the air.

Other adverse effects

Other adverse effects High concentrations may harm aquatic life by the effect on pH.

13. DISPOSAL CONSIDERATIONS**Waste treatment methods**

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

14. TRANSPORT INFORMATION**ADG**

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

UN number 1005
Proper shipping name AMMONIA, ANHYDROUS
Hazard class 2.3
Subsidiary hazard class 8
Hazchem code 2XE

IATA

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS.

TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

UN number 1005
UN proper shipping name AMMONIA, ANHYDROUS
Transport hazard class(es) 2.3
Subsidiary hazard class 8

IMDG

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN number 1005
UN proper shipping name AMMONIA, ANHYDROUS
Transport hazard class(es) 2.3
Subsidiary hazard class 8
IMDG EMS Fire F-C
IMDG EMS Spill S-U
Marine pollutant Yes

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

Australia

Classified as dangerous goods in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG).

Classified as a hazardous chemical in accordance with the criteria of Safe Work Australia - Globally Harmonized System (GHS).

See section 8 for national exposure control parameters

Poisons Schedule (SUSMP) 6

Major hazard (accident/incident planning) regulation

Verify that license requirements are met

Chemical name	Threshold quantity (T)
Ammonia - 7664-41-7	200 tonne TQ anhydrous, liquefied or solution; relative density <0.880 at 15°C in water; with >50% Ammonia

National pollutant inventory

Subject to reporting requirement

Chemical name	National pollutant inventory
Ammonia - 7664-41-7	10 tonne/yr Threshold category 1 total

International Inventories

AIIC This material is listed on the Australian Inventory of Industrial Chemicals.
NZIoC This material is listed on the New Zealand Inventory of Chemicals.

Legend:

- Australian Inventory of Industrial Chemicals

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

16. OTHER INFORMATION

Reason(s) For Issue: 5 Yearly Revised Primary SDS

Issuing Date: 13-Oct-2021

This Safety Data Sheet has been prepared by Ixom Operations Pty Ltd (Toxicology and SDS Services).

Revision Note:

The symbol (*) in the margin of this SDS indicates that this line has been revised.

Key or legend to abbreviations and acronyms used in the safety data sheetLegend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation
C	Carcinogen		

Key literature references and sources for data used to compile the SDS

EPA (Environmental Protection Agency)
 Acute Exposure Guideline Level(s) (AEGl(s))
 U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
 U.S. Environmental Protection Agency High Production Volume Chemicals
 Food Research Journal
 Hazardous Substance Database
 International Uniform Chemical Information Database (IUCLID)
 Japan GHS Classification
 Australian Industrial Chemicals Introduction Scheme (AICIS)
 NIOSH (National Institute for Occupational Safety and Health)
 National Library of Medicine's ChemID Plus (NLM CIP)
 National Library of Medicine's PubMed database (NLM PUBMED)
 National Toxicology Program (NTP)
 New Zealand's Chemical Classification and Information Database (CCID)
 Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
 Organization for Economic Co-operation and Development High Production Volume Chemicals Program
 Organization for Economic Co-operation and Development Screening Information Data Set
 RTECS (Registry of Toxic Effects of Chemical Substances)
 World Health Organization

Disclaimer

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.

End of Safety Data Sheet