Based on GHS (rev 3) (2009)
- Australia

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SAFETY DATA SHEET

Anhydrous Ammonia

Section 1. Identification

Product identifier	:	Anhydrous Ammonia
Product type	:	gas (Liquefied gas.)
Product code	:	PA01HL

Uses

Area of application	:	Industrial applications, Professional applications

Supplier

Supplier's details	:	YARA PILBARA FERTILISERS PTY LTD

Address

Street	:	Level 5, 182 St Georges Terrace
Postal code	:	6000
City	:	Perth
Country	:	Australia
Telephone number	:	+61 8 9183 4000
Fax no.	:	+61 8 9185 6776
e-mail address of person responsible for this SDS	:	Info.yara.pilbara@yara.com
Emergency telephone number (with hours of operation)	:	Australia: 1800 117 506. Intl: +61 2801 44558 / +44 (0) 1235 239 670 (24 HRS)

National advisory body/Poison Center

Name	:	WA Poisons Information Centre
Telephone number	:	131126
Hours of operation	:	24 hours, within Australia only

Section 2. Hazard(s) identification

Classification and labelling have been performed following the guidelines and recommendation of GHS and the intended use.

Classification of the substance or mixture :

GHS label elements

Signal word : Danger

Hazard statements :

Precautionary statements

Prevention	:	P280-d	Wear protective gloves/clothing and eye/face protection.

		P260-b	Do not breathe gas or vapour.
Response	:	P305	IF IN EYES:
		P351	Rinse cautiously with water for several minutes.
		P338	Remove contact lenses, if present and easy to do. Continue rinsing.
		P304	IF INHALED:
		P340	Remove person to fresh air and keep comfortable for breathing.
		P310	Immediately call a POISON CENTER or doctor/physician.
		P303	IF ON SKIN (or hair):
		P361-a	Take off immediately all contaminated clothing.
		P353-a	Rinse skin with water.
Storage	:	P410 + P403	Protect from sunlight and store in well-ventilated place.

Statement of hazardous/dangerous nature : HAZARDOUS SUBSTANCE.
DANGEROUS GOODS.
Anhydrous ammonia is classified for physicochemical hazards and specified as dangerous in the Australian code for Transport of dangerous Goods by Road and rail (ADG code) 6th edition.

Supplemental label elements :

Other hazards which do not result in classification : Liquid can cause burns similar to frostbite.

Section 3. Composition and ingredient information

Substance/mixture : Substance

CAS number/other identifiers

Other means of identification : ammonia, anhydrous
CAS number : 7664-41-7
EC number : 231-635-3

Ingredient name	CAS number	
ammonia, anhydrous	CAS: 7664-41-7	

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Remark : 99.5 % (wt/wt) anhydrous ammonia, remainder water

Chemical formula : NH3

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water for at least 15 minutes, keeping eyelids open. Check for and remove any contact lenses. Get medical attention immediately.

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Corrosive to eyes. Causes burns. Liquid can cause burns similar to frostbite.

Inhalation : Toxic by inhalation. May give off gas, vapour or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Corrosive to the skin. Causes burns. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion : May cause burns to mouth, throat and stomach. Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain
watering
redness
frostbite (Cryogenic burn)

Inhalation : Adverse symptoms include the following:
coughing
wheezing and breathing difficulties
asthma

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
frostbite (Cryogenic burn)

Ingestion : Adverse symptoms may include the following:
frostbite (Cryogenic burn)

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. In case of inhalation of decomposition products in a fire,

symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : In case of fire, allow gas to burn if flow cannot be shut off immediately. Use an extinguishing agent suitable for the surrounding fire. Apply water from a safe distance to cool container and protect surrounding area.

Unsuitable extinguishing media : None identified.

Specific hazards arising from the chemical : Hazchem Code: ZRE. Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
nitrogen oxides
Avoid breathing dusts, vapors or fumes from burning materials.
In case of inhalation of decomposition products in a fire, symptoms may be delayed.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

Remark : None.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard.No action shall be taken involving any personal risk or without suitable training.Evacuate surrounding areas.Keep unnecessary and unprotected personnel from entering.Do not touch or walk through spilled material.Shut off all ignition sources.No flares, smoking or flames in hazard area.Do not breathe gas.Provide adequate ventilation.Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and material for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).
Contains gas under pressure.Do not get in eyes or on skin or clothing.Do not breathe gas.Avoid release to the environment.Use only with adequate ventilation.Wear appropriate respirator when ventilation is inadequate.Do not enter storage areas and confined spaces unless adequately ventilated.Store and use away from heat, sparks, open flame or any other ignition source.Use explosion-proof electrical (ventilating, lighting and material handling) equipment.Use only non-sparking tools.Empty containers retain product residue and can be hazardous.Do not puncture or incinerate container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective

equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Australian Standard AS 2022: Anhydrous ammonia storage and handling. Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Store locked up. Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

Section 8. Exposure controls and personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
ammonia, anhydrous	**NOHSC (1995-05-01)** **STEL** 24 mg/m3, 35 ppm **NOHSC (1995-05-01)** **TWA** 17 mg/m3, 25 ppm

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.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : A washing facility or water for eye and skin cleaning purposes should be present.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If inhalation hazards exist, a full-face respirator may be required instead. Recommended: full-face mask

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn.
> 8 hours (breakthrough time): butyl rubber, PTFE, Viton
< 1 hour (breakthrough time): Insulated gloves suitable for low temperatures

Body protection : Personal protective equipment for the body should be selected

based on the task being performed and the risks involved.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: ammonia filter (Type K) self-contained breathing apparatus (SCBA)

Personal protective equipment (Pictograms) :

Section 9. Physical and chemical properties

Appearance

Physical state : gas [Liquefied gas.]
Color : Colorless.
Odor : Pungent.
Odor threshold : 5 ppm

pH : Not determined.
Melting/freezing point : -78 °C

Boiling/condensation point : -33 °C
(-33 °C)

Sublimation temperature : Not determined.
Flash point : Not determined.
Evaporation rate : Not determined.
Flammability (solid, gas) : Flammable

Lower and upper explosive (flammable) limits : **Lower:** 15 %(V)

Upper: 27 %(V)

Vapor pressure : 8,611 hPa @ 20 °C (20 °C)

Vapor density : 0.6 [Air = 1]

Relative density : 0.682 @ -33.4 °C (-33.4 °C)

Solubility : Not determined.
Solubility in water : 510 - 531 g/l @ 20 °C (20 °C)

Partition coefficient: n-octanol/water : Not determined.
Auto-ignition temperature : 651 °C (651 °C)

Decomposition temperature : Not determined.

Viscosity	:	**Dynamic:** 0.22 mPa.s
	:	**Kinematic:** Not determined.
Explosive properties	:	None.
Oxidizing properties	:	None.

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Incompatible materials	:	Reacts violently with halogens. Reactive with acids and oxide. Corrosive to galvanized metal. Corrosive to brass, Cu, Zn, Ag and Hg.
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

Product / ingredient name	Result	Species	Dose	Exposure	References
ammonia, anhydrous					
	LC50 Inhalation	Rat	9.85 mg/l	1 h	IUCLID 5
	LC50 Inhalation	Rat	7.939 mg/l	1 h	IUCLID 5

Conclusion/Summary : Toxic by inhalation.

Irritation/Corrosion

Conclusion/Summary

Skin	:	Corrosive.
Eyes	:	Causes serious eye damage.
Respiratory	:	Corrosive to the respiratory system.

Sensitization

Conclusion/Summary

Skin : Not sensitizing

Respiratory : Not sensitizing

Mutagenicity

Conclusion/Summary : No mutagenic effect.

Carcinogenicity

Product / ingredient name	Result	Species	Dose	Exposure	References
ammonia, anhydrous	Negative - Oral - NOAEL 453 Combined Chronic Toxicity/Carcinogenicity Studies	Rat	67 mg/kg bw/day	Not applicable.	IUCLID 5

Conclusion/Summary : No carcinogenic effect.

Reproductive toxicity

Product / ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure	References
ammonia, anhydrous	Not applicable.	Negative	Not applicable.	Rat	Oral: 408 mg/kg bw/day OECD 422	28 days	IUCLID 5
ammonia, anhydrous	Not applicable.	Not applicable.	Negative	Rabbit	Oral: 100 mg/kg bw/day OECD 414	28 days	IUCLID 5
ammonia, anhydrous	Not applicable.	Not applicable.	Negative	Pig	Inhalation: 25 mg/m³	6 weeks	IUCLID 5

Conclusion/Summary : No known significant effects or critical hazards.

Teratogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

No known significant effects or critical hazards.

Specific target organ toxicity (repeated exposure)

No known significant effects or critical hazards.

Aspiration hazard

No known significant effects or critical hazards.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Corrosive to eyes. Causes burns. Liquid can cause burns similar to frostbite.

Inhalation : Toxic by inhalation. May give off gas, vapour or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Corrosive to the skin. Causes burns. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion : May cause burns to mouth, throat and stomach. Ingestion of liquid can cause burns similar to frostbite.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain
watering
redness
frostbite (Cryogenic burn)

Inhalation : Adverse symptoms include the following:
coughing
wheezing and breathing difficulties
asthma

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
frostbite (Cryogenic burn)

Ingestion : Adverse symptoms may include the following:
frostbite (Cryogenic burn)

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary : Corrosive to the respiratory tract.

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain
watering
redness
frostbite (Cryogenic burn)

Inhalation : Adverse symptoms include the following:
coughing
wheezing and breathing difficulties
asthma

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
frostbite (Cryogenic burn)

Ingestion : Adverse symptoms may include the following:
frostbite (Cryogenic burn)

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product / ingredient name	Result	Species	Exposure	References
ammonia, anhydrous				
	Acute LC50 0.89 mg/l Fresh water	Fish	96 h	IUCLID 5
	Acute LC50 101 mg/l Fresh water	Daphnia	48 h	IUCLID 5
	Acute EC50 2,700 mg/l Fresh water	Algae	18 d	IUCLID 5
	Chronic No-observable-effect-concentration < 0.048 mg/l Fresh water 215 Fish,	Channel catfish	31 d	IUCLID 5

	Juvenile Growth Test			
	Chronic No-observable-effect-concentration 0.79 mg/l Fresh water	Daphnia	96 h	IUCLID 5

Conclusion/Summary : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Persistence and degradability

Conclusion/Summary : The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative potential

Product / ingredient name	LogPow	BCF	Potential
ammonia, anhydrous	0.23	Not applicable.	low

Conclusion/Summary : No known significant effects or critical hazards.

Mobility in soil

Soil/water partition coefficient (KOC) : Not available.

Mobility : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Product

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

Regulation: ADG	
14.1 UN number	1005

14.2 UN proper shipping name	
14.3 Transport hazard class(es)	2.3 
14.4 Packing group	Not applicable.
14.5 Environmental hazards	Yes.
Additional information	

Regulation: ADR/RID	
14.1 UN number	1005
14.2 UN proper shipping name	AMMONIA, ANHYDROUS
14.3 Transport hazard class(es)	2 
14.4 Packing group	
14.5 Environmental hazards	Yes.
Additional information	
Hazard identification number	**:** 268
Tunnel code	**:** (C/D)

Regulation: IMDG	
14.1 UN number	1005
14.2 UN proper shipping name	AMMONIA, ANHYDROUS
14.3 Transport hazard class(es)	2.3 
14.4 Packing group	
14.5 Environmental hazards	Yes.
Additional information	
Marine pollutant	**:** Yes.
IMDG Code Segregation group	**:** SG18
Emergency schedules (EmS)	**:** F-C, S-U

Regulation: IATA	
14.1 UN number	1005
14.2 UN proper shipping name	AMMONIA, ANHYDROUS
14.3 Transport hazard class(es)	2.3

	
14.4 Packing group	
14.5 Environmental hazards	Yes.
Additional information **Marine pollutant**	: Yes.

14.6 Special precautions for user : Transport within user's premises: Ensure that persons transporting the product know what to do in the event of an accident or spillage.

IMSBC : Not applicable.

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

Section 15. Regulatory information

Standard for the Uniform Scheduling of Drugs and Poisons

SUSDP Poison Schedule 6. Licensing is required.

Model Work Health and Safety Regulations - Scheduled Substances

Australia inventory (AICS) : All components are listed or exempted.

References : EU REACH IUCLID5 CSR.
National Institute for Occupational Safety and Health, U.S. Dept. of Health, Education, and Welfare, Reports and Memoranda Registry of Toxic Effects of Chemical Substances.
IHS, 4777 Levy Street, St Laurent, Quebec HAR 2P9, Canada.

International lists

Philippines inventory (PICCS): All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Japan inventory: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Canada inventory (DSL and NDSL): All components are listed or exempted.
Malaysia Inventory (EHS Register): All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted.
United States inventory (TSCA 8b): All components are listed or exempted.
EC INVENTORY (EINECS/ELINCS): All components are listed or exempted.

Safety, health and environmental regulations specific for the product : No known other specific national and/or regional regulations applicable to this product (including its ingredients).

Section 16. Any other relevant information

Key to abbreviations : ADG = Australian Dangerous Goods
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
bw = Body weight
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NOHSC - National Occupational Health and Safety Commission
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations

Procedure used to derive the classification

References : EU REACH IUCLID5 CSR.
National Institute for Occupational Safety and Health, U.S. Dept. of Health, Education, and Welfare, Reports and Memoranda Registry of Toxic Effects of Chemical Substances.
IHS, 4777 Levy Street, St Laurent, Quebec HAR 2P9, Canada.

History

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Prepared by	:	Yara Chemical Compliance (YCC).

|| Indicates information that has changed from previously issued version.

Notice to reader

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