

Anhydrous Ammonia

1 - IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY

Trade name	Anhydrous Ammonia
Designation	Chemical intermediate
Company address	GrowHow UK Limited, Ince, Chester CH2 4LB
Telephone	+44 (0) 151 357 2777
Telefax	+44 (0) 151 357 1755
E-mail address	info@growhow.co.uk
Technical queries	01642 542 873
In case of Emergency telephone	01642 546 800

2 – HAZARDS IDENTIFICATION

Human Health

Skin contact	}	Corrosive. Liquid splashes, or spray, may cause freeze burns.
Eye Contact		
Ingestion		
Inhalation		Toxic by inhalation.
Fire and Thermal		Ammonia vapour is flammable in air at concentrations between 16% and 27%.
Environment		Very toxic to aquatic organisms

3 – COMPOSITION / INFORMATION ON INGREDIENTS

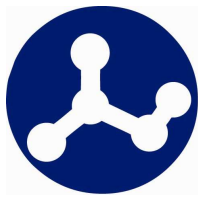
CAS Number	Ammonia	007664-41-7
EC (EINECS) Number		231-635-3
Alternative names	Anhydrous Ammonia – Premium Grade or Standard Grade	
Molecular Formula	NH ₃	
Product description	Clear colourless liquid.	
Form	Liquefied gas at pressure	
Concentration	100% ammonia	
Classification	Toxic and Corrosive	

4 - FIRST AID MEASURES

Product

IN ALL CASES OF CONTAMINATION OBTAIN IMMEDIATE MEDICAL ATTENTION

Skin contact	Caution: In the event of splashing with liquid ammonia clothing may adhere to skin by freezing. Drench with large quantities of water whilst carefully removing contaminated clothing. Continue to wash the affected area until medical attention arrives.
Eye contact	Immediately irrigate with eyewash solution or clean water, holding eyelids apart with assistance, if available. Continue irrigation until medical attention can be obtained.
Ingestion	Do not induce vomiting. Wash out mouth with water and give 200-300ml (half a pint) of water to drink.
Inhalation	Remove from source of exposure to fresh air. Keep warm and at rest. Apply artificial resuscitation if breathing has ceased or shows signs of failing.



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Further medical treatment

Treat as a thermal burn. Administer oxygen if necessary. Following severe exposure the patient should be kept under medical review for at least 48 hours as delayed pulmonary oedema may develop.

Fire and Decomposition Products**Inhalation**

A leak of anhydrous ammonia can reach its flammability concentration, especially in confined spaces. Oxides of nitrogen will be evolved during decomposition.

5 - FIRE FIGHTING MEASURES

If product is not directly involved in the fire

Keep containers cool by spraying with water. **Caution:** Under certain climatic conditions water can have a warming effect on the storage container.

If product is involved in the fire:

Ammonia is flammable but is not readily ignited. Combustion will evolve toxic and irritant vapours.
Call the fire brigade. Avoid breathing vapours and fumes, which are toxic. Approach from upwind of the fire. Use a self-contained breathing apparatus and suitable protective clothing in dealing with a fire involving ammonia. Fight the fire appropriate to the materials involved. Consider effects of reaction between ammonia and other materials. Contain fire fighting water if contaminated. Inform the local authorities immediately if water containing ammonia enters any drains or watercourse.

Extinguishing media

Foam, dry powder or carbon dioxide. Water spray should only be used to knock down escaping vapour.

6 - ACCIDENTAL RELEASE MEASURES

Spillages

People dealing with major spillages should wear full protective clothing including respiratory protection suitably resistant to this chemical. Contain spillages. Consider covering with foam to reduce evaporation. Water spray should only be used to knock down escaping vapour. Warn people downwind. Isolate the leak as quickly as possible. Ventilate the area if appropriate. Assemble personnel in designated assembly points. Take care to avoid contamination of watercourses and drains and inform the appropriate authority in case of accidental contamination of watercourses. Do not add water to a spillage of ammonia.

7 - HANDLING & STORAGE

Handling

Avoid contact with skin and eyes. Use only in well ventilated areas. Atmospheric levels should be controlled in compliance with the current workplace exposure limits. Basic personal protective equipment, (PPE), includes, butyl or nitrile gloves and overalls, chemical goggles and Wellington boots (or rubber boots). Individuals should make a judgement as to whether equivalent items are suitable for avoiding contact. Provide adequate ventilation and respiratory protection. Do not exceed recommended exposure levels.

Storage

Keep storage systems closed, in a cool well ventilated place, where possible. Keep away from heat and sources of ignition. Heating of the containment system may cause pressure rise. Suitable containers are manufactured from carbon or stainless steel. Containers made from or containing copper, copper alloy, zinc or zinc alloy are unsuitable. Storage temperature should be below 45° C.

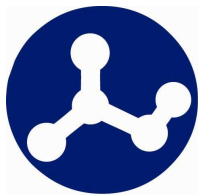
For further information see: GrowHow UK Limited brochure; **Anhydrous Ammonia, Handling and Storage of Bulk Liquid.**

For further technical information contact GrowHow on the telephone number in Section 1

8 - EXPOSURE CONTROL / PERSONAL PROTECTION**Workplace Exposure Limits**

Hazardous ingredients	Workplace Exposure Limits			
	Long-term exposure limit (8 hr TWA reference period)		Short-term exposure limit (15 min reference period)	
	ppm	mg/m ³	ppm	mg/m ³
Ammonia	25	18	35	25

Definition: TWA = Time weighted average.
Concentration in ppm or mg/m³ of a chemical component multiplied by the time of each individual sampling period, summed for all samples taken during an interval and divided by the total sampling time.
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Precautionary/Engineering Measures	Local Exhaust Ventilation may be required to reduce vapour levels, in certain circumstances
Personal Protection	See Section 7. Butyl and nitrile rubber are better than PVC. Wear thermal insulating gloves and a face shield when handling liquefied gases.

9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance/ Form	:	Colourless liquid evolving colourless to white gas cloud, dependent on atmospheric conditions.
Odour	:	Pungent. Detectable by most people at concentrations as low as 5 ppm.
pH	:	14, highly alkaline
Melting point	:	-77°C
Boiling point	:	-33°C
Flash Point	:	No data
Flammable Limits (lower)	:	16 (% v/v)
Flammable Limits (Upper)	:	27 (% v/v)
Auto Ignition Temperature	:	651°C
Vapour pressure (Pascals)	:	1470000 at 38°C 430000 at 0°C
Liquid density (g/ml)	:	0.583 at 38°C.
Solubility in water	:	Extremely soluble in water with evolution of heat. Caution, see Section 6.
Vapour density	:	0.67 at 20°C (Air = 1)
Latent Heat of evap ⁿ (kJ/kg)	:	1210 at 15°C.

10 - STABILITY AND REACTIVITY

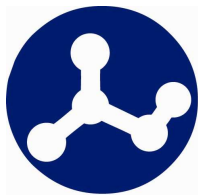
Stability	:	Ammonia is stable under normal conditions of storage, handling and use.
Materials to avoid	:	As mentioned in Section 7 (Storage).
Hazardous Reactions and Decomposition Products	:	Can form unstable or explosive compounds with halogens, hypochlorites, silver, mercury and lead. Can react violently, if in contact with strong acids or nitrogen oxides.
Combustion products	:	Oxides of nitrogen. Dissociates to hydrogen and nitrogen above 450°C

11 - TOXICOLOGICAL INFORMATION

Inhalation (human)	Nasal and pulmonary irritation at concentrations of 100 ppm and higher	
Skin Contact	Causes burns. It is not a skin sensitiser in animal tests.	
Eye Contact	The vapour is an irritant at low levels but the liquid will cause eye damage. Liquid splashes or spray may also cause freeze burns. It may cause permanent damage if the eye is not immediately irrigated. Opacity may develop over a number of days.	
Ingestion	Will immediately cause corrosion of, and damage to, the gastrointestinal tract.	
Long Term Exposure	Repeated exposure to levels well above the occupational exposure limit may produce adverse affects on lungs. The severity of the acute effects is such that significant repeated or prolonged exposure is unlikely.	
Toxicity Data	Acute oral toxicity (LD ₅₀)	: 350 mg/kg (Rat).
	Acute toxicity of the gas (LC ₅₀)	: 2520 ppm (Mouse.).

12 - ECOLOGICAL INFORMATION

Environmental Fate and Distribution	High tonnage material produced in partially contained systems. The substance is soluble in water. It has low potential for bioaccumulation. The substance has low mobility in soil.
Persistence and Degradation	There is evidence of photodegradation in air.
Eco-toxicity	Ammonium ion predominates in most waters, increases in pH above 7.5 will lead to increased level in non-ionised ammonia which is markedly more toxic to aquatic life. Very toxic to aquatic organisms. LCO (96 hour) (various species) <1mg/l. Studies in fish have shown that repeated exposures produce adverse effects on growth rate at concentrations greater than 0.0024 mg/l. EC ₅₀ (Daphnia magna) (48 hour) 24.4 – 189 mg/l. WGK 2 (official classification).



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13 - DISPOSAL CONSIDERATIONS

Disposal Dispose of in a manner consistent with prevailing regulations. Disposal should be in accordance with local, state or national legislation. Re-using the substance should take priority over disposing as a waste.

14 - TRANSPORT INFORMATION

AIR

ICA O / IATA Class - primary : 2.3
 - subsidiary 1 : 8
 - subsidiary 2 : None

SEA

IMDG Class - primary : 2.3 Toxic gas
 - subsidiary 1 : 8 Corrosive

Proper Shipping Name : AMMONIA, ANHYDROUS

ROAD/RAIL

UN No and proper shipping name : UN 1005, AMMONIA, ANHYDROUS
 ADR/RID Class : 2
 ADR/RID Item No : 2TC
 ADR HIN : 268
 Classification (Packages) : 2.3
 Classification (Tankers) : 2.3, sub 8

UK TANKER REGULATIONS: DANGEROUS GOODS

Emergency Action Code : 2 RE

15 - REGULATORY INFORMATION

EU Directives & Regulations	96/82/EC (Control of Major Accident Hazards involving Dangerous Substances) and 2003/105/EC (amendment)
	ADR, (Accord Dangereuse Routiers) 1 st Jan 2009
UK Legislation	Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP 3)
	The Carriage of Dangerous Goods and use of Transportable Pressure Equipment Regulations 2009
	Control of Major Accident Hazards (COMAH) Regulations 1999 and Amendment Regulations 2005
	Occupational Exposure Limits and Monitoring Strategies – Guidance Notes EH40/2000 and HSG173
	Dangerous Goods Emergency Action Code List 2009
EEC Classification	<ul style="list-style-type: none"> • TOXIC • DANGEROUS FOR THE ENVIRONMENT
Safety Phrases	<ul style="list-style-type: none"> • S7/9: Keep container tightly closed and in a well ventilated place • S16: Keep away from sources of ignition – No smoking. • S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. • S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. • S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). • S61: Avoid release to the environment. Refer to special instructions/ Safety Data Sheet.
Risk Phrases	<ul style="list-style-type: none"> • R10: Flammable. • R23: Toxic by inhalation. • R34: Causes burns. • R50: Very toxic to aquatic organisms.

16 - OTHER INFORMATION

This safety data sheet provides health and safety information. The product is to be used in applications consistent with GrowHow literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. Please consult GrowHow Technical Services Manager for any further advice. The product information in this data sheet is to the Company's knowledge correct at the date of publication. The user should contact the Company for updated advice and in any event must be satisfied that the product is entirely suited for its purpose. The Company accepts no liability for any loss or damage (other than that arising from death or personal injury caused by negligence if proved) resulting from reliance on this information. Freedom from patent restrictions cannot be assumed.

Reference Anhydrous ammonia
 Revision Number 2 Growhow
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