Ammonia Solution

1 - IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY

Trade name	**Ammonia Solution**
Designation	Chemical intermediate
Company address	GrowHow UK Limited, Ince, Chester CH2 4LB
Telephone Telefax E-mail address	+44 (0) 151 357 2777 +44 (0) 151 357 1755 info@growhow.co.uk
Technical queries	+44 (0) 1642 542 873
In case of Emergency telephone	**+44 (0) 1642 546 800**

2 – HAZARDS IDENTIFICATION

Human Health

Skin contact Eye Contact Ingestion	Corrosive. Causes severe burns to all parts of the body
Inhalation	Ammonia vapour is 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 Demineralised water	001336-21-6 7732-18-5
EC (EINECS) Number	215-647-6	
Alternative names	Ammonia liquor, Ammonium hydroxide, Aqueous ammonia, Aqua ammonia	
Molecular Formula	NH_4 OH	
Product description	Solution of ammonia in water. A clear colourless liquid evolving ammonia vapour.	
Form	Liquid	
Concentration	10% to 35%	
Classification	Corrosive	

4 - FIRST AID MEASURES

Product

IN ALL CASES OF CONTAMINATION OBTAIN IMMEDIATE MEDICAL ATTENTION

Skin contact	Drench with large quantities of water whilst removing contaminated clothing. Continue to wash the affected area until medical attention arrives.
Eye contact	Immediately irrigate with eyewash solution or clean water. Obtain assistance to hold eyelids apart. Continue irrigation until medical attention arrives.
Ingestion	Do not induce vomiting. Wash out mouth with water and give 200-300ml (half a pint) of water to drink.
Inhalation	Remove patient from source of exposure wearing breathing protection as appropriate to the prevailing conditions. Keep warm and at rest in fresh air. Apply artificial resuscitation if breathing has ceased or shows 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

Ammonia solution does not burn. Ammonia vapour will be given off especially when heated and can reach flammable limits, especially in confined spaces. Oxides of nitrogen can be evolved during decomposition

5 - FIRE FIGHTING MEASURES

If product is not directly involved in the fire	Keep containers cool by spraying water on them
If product is involved in the fire:	Vapour is combustible, but not readily ignited. Combustion will evolve toxic and irritant vapours. Call the fire brigade. Avoid breathing fumes which are toxic. Approach from upwind of the fire. A self-contained breathing apparatus and suitable protective clothing should be worn in fire conditions. Consider effects of reaction between other materials and ammonia. Contain fire fighting water if contaminated. Inform the local authorities immediately if water containing ammonia enters any drains or watercourse.
Extinguishing media	Fight the fire appropriate to the materials involved. .

6 - ACCIDENTAL RELEASE MEASURES

Spillages	People dealing with major spillages should wear full protective clothing including respiratory protection. Warn people downwind. Isolate the leak as quickly as possible. Ventilate the area. Assemble personnel in designated assembly points, up wind of release. Absorb spillages onto sand, earth or any suitable absorbent material. Consider covering with foam to reduce vaporisation. Water spray should only be used to knock down escaping vapour. Spillages or uncontrolled discharges into watercourse must be alerted to the Regulatory Authorities.

7 - HANDLING & STORAGE

Handling	Avoid contact with skin and eyes. Provide adequate ventilation and use only in well ventilated areas. Atmospheric levels should be controlled in compliance with the Workplace Exposure Limit, (WEL). Eye wash equipment must be provided at handling points. Basic personal protective equipment, (PPE), includes PVC or rubber gloves, chemical goggles, Wellingtons or rubber boots and PVC overalls or apron. Individuals should make a judgement as to whether equivalent items are suitable for avoiding contact. Respiratory protection should be worn where there is a risk of breathing vapours.
Storage	Keep storage equipment properly closed and vented to a safe location. Keep away from all heat and ignition sources of ignition. Provide adequate containment, either by means of a bund or a 'double-skinned' storage tank. Suitable containers can be manufactured from a range of materials including mild steel, stainless steel, polyethylene and polypropylene. Containers made from, or containing copper, copper alloy, zinc or zinc alloy are unsuitable.

For further information see GrowHow UK Limited brochure: **Ammonia Solution Storage, Handling and Dilution**.
For other technical information contact Growhow at the address in Section 1.

8 - EXPOSURE CONTROL / PERSONAL PROTECTION

Workplace Exposure Limits

Hazardous ingredient(s)	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 Solution	25	17	35	24

Definition: TWA = Time weighted average. Concentration in ppm or mg/m^3 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.

Precautionary/Engineering Measures	Local Exhaust Ventilation may be required to reduce exposure levels in certain circumstances
Personal Protection	See Section 7.

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9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	A clear colourless liquid
Colour	:	<5 Hazen Units
Odour	:	Pungent
Odour threshold (ppm)	:	Detectable to most people at levels as low as 5ppm
pH	:	14 @ 33.5% (w/w), 13.3 @ 25% (w/w)
Boiling point	:	23^{o}C @ 33.5% (w/w), 40^{o}C @ 25% w/w)
Flammable Limits	:	16% to 27% (v/v)
Auto Ignition Temperature	:	650^{o} C ammonia vapour
Vapour pressure (Pascals)	:	33.5% w/w, 115000 at 20^{o}C; 25% w/w, 50000 at 20^{o}C
Density (g/ml)	:	33.5% w/w, 0.884 at 15.6^{o} C; 25% w/w, 0.910 @ at 15.6^{o} C
Solubility in water	:	Miscible
Partition Coefficient	:	N-octanol/water: P -1.14
Freezing Point (Dec C)	:	-94^{o} C (33.5% w/w) -62^{o} C (25% w/w)

10 - STABILITY AND REACTIVITY

Stability	Ammonia solution is stable under normal conditions of storage, handling and use.
Hazardous Reactions and Decomposition Products	Can react violently if in contact with acids, halogens, hypochlorite or mercury Combustion products: nitrogen oxides.

11 - TOXICOLOGICAL INFORMATION

Inhalation	Atmospheric concentrations in excess of the workplace exposure limits may lead to irritation of eyes and respiratory system. Ammonia vapour combines with bodily moisture to form a corrosive solution. Fluid build up on the lung (pulmonary oedema) may occur up to 48 hours after exposure and in extreme cases could prove fatal. Ammonia can be fatal if swallowed or inhaled in sufficient quantity. When heated it will evolve toxic vapours and eventually decompose. See section 5.
Skin Contact	Causes burns.
Eye Contact	Causes 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 damage to the gastrointestinal tract. Ammonia can be fatal if swallowed.
Long Term Exposure	Repeated exposure to levels well above the occupational exposure limit may produce adverse effects on the lungs. The severity of the acute effects is such that significant repeated or prolonged exposure is unlikely.
Toxicity Data	Oral-Rat LD50 350 mg kg^{-1}

12 - ECOLOGICAL INFORMATION

Environmental Fate & Distribution	High tonnage material used in partially contained systems. Liquid with high volatility. The substance is soluble in water. It has low potential for bioaccumulation.
Persistence and Degradation	The product is substantially biodegradable in water. There is evidence of photo degradation in air.
Eco-toxicity	Ammonium ion predominates in most waters, increases in pH 7.5 will lead to increased level if non-ionised ammonia which is markedly more toxic to aquatic life. Very toxic to aquatic organisms (Self classification). 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. EC50 (Daphnia magna) (48 hour) 25.4 – 189 mg/l. WGK 2 (official classification)
Effect on Effluent Treatment	Large discharges may contribute to the failure of treatment systems and damage sewage treatment organisms.

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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.

14 - TRANSPORT INFORMATION

UN Classification : Class 8. Corrosive
Packing Group : III

SEA
IMDG Class : 8
UN Pack. Group Sea : III

ROAD/RAIL
UN No. and proper shipping name : UN 2672, AMMONIA SOLUTION
UN Classification : Class 8. Corrosive
Packing Group : III
Emergency Action Code : 2R
ADR HIN : 80

UK TANKER REGULATIONS : DANGEROUS GOODS
Emergency Action Code : 2R

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) 1st 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	CORROSIVE
Safety Phrases	• **S7/9** : Keep container tightly closed and in a well ventilated place
	• **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	• **R35**: Causes severe burns
	• **R51**: Toxic to aquatic organisms
	• **R53**: May cause long-term adverse effects in the aquatic environment

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 Ammonia solution
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