

NFPA Classification	DOT / TDG Pictograms	WHMIS Classification	HMIS		PROTECTIVE CLOTHING
			Health	2	
			Flammability	0	
			Reactivity	0	
			PPE	H	

## Section I. Chemical Product and Company Identification

**PRODUCT NAME/ TRADE NAME** Aqua Ammonia Solutions 10-35% Ammonia

**SYNONYM** NH<sub>4</sub>OH, Aqueous Ammonia, Ammonia Solution, Ammonia Water. This MSDS applies but is not limited to the following Agrium solutions composed of ammonia dissolved in water:  
 Aqua Ammonia 19%  
 Aqua Ammonia 20-0-0,  
 Aqua Ammonia 24-0-0  
 Aqua Ammonia 26 Be  
 Aqua Ammonia Neutralization Grade

**MSDS NUMBER:** 16005

**CHEMICAL NAME** Ammonium Hydroxide

**REVISION NUMBER** 1.2

**CHEMICAL FAMILY** An inorganic alkali liquid (Alkali.)

**MSDS prepared by** Bcj Ya Vyf 85, 200-  
 the Environment,  
 Health and Safety  
 Department on:

**CHEMICAL FORMULA** NH<sub>4</sub>OH·H<sub>2</sub>O

**MATERIAL USES** Agricultural use.: Fertilizer.  
 Industrial applications: Cleaning solutions.  
 Metal industry: Metallurgy. Ore processing.

### 24 HR EMERGENCY TELEPHONE NUMBER:

Transportation: 1-800-792-8311  
 Medical: 1-888-670-8123

#### MANUFACTURER

Agrium  
 North American Wholesale  
 13131 Lake Fraser Drive, S.E.  
 Calgary, Alberta, Canada, T2J 7E8

Agrium U.S. Inc.  
 Suite 1700, 4582 South Ulster St.  
 Denver, Colorado, U.S.A., 80237

#### SUPPLIER

Agrium  
 North American Wholesale  
 13131 Lake Fraser Drive, S.E.  
 Calgary, Alberta, Canada, T2J 7E8

Agrium U.S. Inc.  
 Suite 1700, 4582 South Ulster St.  
 Denver, Colorado, U.S.A., 80237

## Section II. Hazardous Ingredients

NAME	CAS #	Exposure Limits (ACGIH)						% by Weight
		TLV-TWA mg/m <sup>3</sup>	TLV-TWA ppm	STEL mg/m <sup>3</sup>	STEL ppm	CEIL mg/m <sup>3</sup>	CEIL ppm	
Ammonium hydroxide	1336-21-6		25 as NH <sub>3</sub>		35 as NH <sub>3</sub>			10-35 as NH <sub>3</sub>

#### ACGIH TLV notations:

---- No assigned TLV

(C) - Ceiling - the concentration not to be exceeded at any time  
 (I) - measured as the Inhalable fraction of the aerosol

(R) - measured as the Respirable fraction of the aerosol  
 (T) - measured as the Thoracic fraction of the aerosol

Continued on Next Page

<b>TOXICOLOGICAL DATA ON INGREDIENTS</b>	<p><b>Aqueous Ammonia TFI Product Testing Program Results:</b>                  LD<sub>50</sub> Acute oral: 350 mg/kg Rat, 1 hour.</p> <p>Ecotoxicity: Acute fish toxicity, LC<sub>50</sub>, 24 hr, various species, 0.08-0.1 mg un-ionized ammonia/L;                  Acute aquatic invertebrate toxicity, Daphnia magna, 48 hr TLM: 16 mg total ammonia/L</p> <p><b>Anhydrous Ammonia 82-0-0:</b>                  TFI Product Testing Program Results:                  GAS LC<sub>50</sub> Acute: 4,230-19,960 ppm Rat, Mouse 1 hour.                  Subacute and chronic exposure, human: &gt;100 ppm nasal and pulmonary irritation                  100-200 ppm - moderate to severe eye irritation                  200-1,000 ppm - eye damage</p> <p>Ecotoxicity: Acute fish toxicity, LC<sub>50</sub>, 96 hr, various species, 0.09-3.51 mg un-ionized ammonia/L;                  Acute aquatic invertebrate toxicity, Daphnia magna, 48 hr ASTM E-729-80 protocol, LC<sub>50</sub>, 2.94 mg un-ionized ammonia N/L                  Chronic fish toxicity, various species, 12d-5yr, NOEC: 0.025-1.2mg un-ionized ammonia/L;                  Chronic aquatic invertebrate toxicity, Daphnia magna and others, 21d-76wk NOEC: 0.163-0.42 mg un-ionized ammonia/L                  Acute toxicity to terrestrial plants, various species, 4 min-16hrs, foliar injury: LOEC 3-250 ppm, species dependent.</p>
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**Section III. Hazards Identification.**

<b>POTENTIAL ACUTE HEALTH EFFECTS</b>	<p>Corrosive. Dangerous in case of skin or eye contact, ingestion, or inhalation. Liquid or spray mists may produce chemical burns and severe tissue damage on contact with the eyes, the mouth, mucous membranes, and the respiratory tract.</p> <p>Skin contact may produce serious chemical burns.</p> <p>May cause severe burns to the mouth, throat and digestive tract if ingested. Damage may be life threatening.</p> <p>Inhalation of the spray mist or vapors may produce severe irritation of the respiratory tract characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in chemical pneumonitis and pulmonary edema which may be life threatening.</p> <p>Overflow of liquid during filling operations or inhalation of displaced headspace vapor from transport containers may result in severe overexposure to ammonia vapor.</p>
<b>POTENTIAL CHRONIC HEALTH EFFECTS</b>	<p><b>CARCINOGENIC EFFECTS:</b> NONE by ACGIH, EPA, IARC, NTP, OSHA.  <b>MUTAGENIC EFFECTS:</b> NONE by ACGIH, EPA, IARC, NTP, OSHA.  <b>TERATOGENIC EFFECTS:</b> NONE by ACGIH, EPA, IARC, NTP, OSHA.                  Repeated or prolonged exposure to the substance may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mists or vapours may produce respiratory tract irritation leading to frequent attacks of bronchial infection.</p>

**Section IV. First Aid Measures**

<b>EYE CONTACT</b>	<p>Immediately flush eyes with water for 60 minutes or longer keeping eyelids open. Obtain immediate medical attention. Continue to flush eyes, if possible, while transporting to medical care.</p>
<b>MINOR SKIN CONTACT</b>	<p>In case of contact with the chemical, remove contaminated clothing as quickly as possible. <b>Flush exposed skin with copious amounts of water for at least 60 minutes.</b> Use warm water if available. If irritation persists, seek medical attention. Dispose of contaminated clothing in a manner that limits further exposure.</p>
<b>EXTENSIVE SKIN CONTACT</b>	<p>No additional information.</p>
<b>MINOR INHALATION</b>	<p>Using appropriate respiratory protection, remove the affected individual from the area of overexposure. Allow the person to rest in a well ventilated area. If irritation persists, obtain medical attention.</p>

<b>SEVERE INHALATION</b>	In emergency situations use proper respiratory protection to evacuate affected individuals to a safe area as soon as possible. Loosen tight clothing around the person's neck and waist. Oxygen may be administered if breathing is difficult. If the person is not breathing, perform artificial respiration. Obtain immediate medical attention.
<b>SLIGHT INGESTION</b>	Do not induce vomiting. Quickly transport the person to an emergency care facility. Removal of the substance from the stomach must be done by medical personnel. If tolerated, give no more than 1 cup of milk or water (or 1/2 cup for children) to rinse the mouth and throat and dilute the stomach contents.  If spontaneous vomiting does occur, lower the head so that the vomit will not reenter the mouth and throat. Rinse mouth with water.
<b>EXTENSIVE INGESTION</b>	No additional information.

### Section V. Fire and Explosion Data

<b>THE PRODUCT IS</b>	Not combustible, however, evolved ammonia gas may support combustion if allowed to accumulate within a narrow upper and lower flammability limit.
<b>AUTO-IGNITION TEMPERATURE</b>	Not applicable.
<b>FLASH POINT</b>	Not applicable.
<b>FLAMMABILITY LIMITS</b>	Ammonia gas may burn in concentrations between 16 - 25%. Such concentrations may exist in the headspace of storage vessels. Exercise caution.
<b>PRODUCTS OF COMBUSTION</b>	Nitrogen oxides
<b>FIRE HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES</b>	Not applicable.
<b>EXPLOSION HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES</b>	This product is non-explosive.
<b>FIRE FIGHTING MEDIA AND INSTRUCTIONS</b>	Use CO <sub>2</sub> , water spray or fog.
<b>SPECIAL REMARKS ON FIRE HAZARDS</b>	Toxic or combustible gases (ammonia, nitrogen oxides) will be evolved at elevated temperatures.
<b>SPECIAL REMARKS ON EXPLOSION HAZARDS</b>	No additional remark.

### Section VI. Accidental Release Measures

<b>SMALL SPILL</b>	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: <b>Neutralize the residue with a dilute solution of acetic acid such as vinegar.</b>
<b>LARGE SPILL</b>	Corrosive liquid. Wear a self-contained breathing apparatus and appropriate personal protective equipment. (See Exposure Controls/Personal Protection Section) Stop leak if possible to do so without risk. Dike and contain spilled material. Ensure that the spilled material does not enter sewers, wells, or watercourses. Product will promote algae growth which may degrade water quality and taste. Notify downstream water users. Pump up spilled material and place in suitable containers for reuse or disposal. Ensure that clean-up, pumping and holding equipment is metallurgically compatible with ammonia. Ensure disposal complies with local regulations.

**Section VII. Handling and Storage**

<b>PRECAUTIONS</b>	Avoid contact with skin and eyes. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Keep container tightly closed and in a well-ventilated place. Keep out of reach of children.
<b>STORAGE</b>	Keep in a cool, well-ventilated place away from acids. Keep away from food, drink and animal feed. Keep away from living quarters. Keep out of reach of children.

**Section VIII. Exposure Controls/Personal Protection**

<b>ENGINEERING CONTROLS</b>	Provide exhaust ventilation or other engineering controls to keep the vapour concentrations below their respective threshold limit values. Ensure that an eyewash station and safety shower is near the work location.
<b>PERSONAL PROTECTION</b>	The selection of personal protective equipment varies, depending upon conditions of use. Wear splash goggles and /or a face shield, PVC chemical resistant protective clothing (jacket and pants), impervious neoprene or PVC gloves, and rubber boots. Use a NIOSH/MSHA approved full facepiece chemical respirator with ammonia cartridges if ventilation is not adequate to maintain ammonia concentrations below the Occupational Exposure Limit. A respiratory protection program that meets OSHA 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.
<b>PERSONAL PROTECTION IN CASE OF LARGE RELEASE</b>	Full chemically resistant protective clothing. Rubber boots and gloves. A self contained breathing apparatus should be used to avoid inhalation of the substance. The selection of personal protective equipment varies, depending on the conditions of use. Suggested protective clothing might not be sufficient; consult a specialist before handling this product.
<b>EXPOSURE LIMITS</b>	Ammonia: ACGIH TLV-TWA: 25 ppm, TLV-STEL: 35 ppm. Alberta OEL: 25 ppm TWA; 35 ppm STEL OSHA PEL:8H TWA 50 ppm (35 mg/m <sup>3</sup> ) NIOSH REL, AMMONIA in air:10H TWA 25 ppm;STEL 35 ppm, IDLH 300 ppm  Federal, State or Provincial exposure limits may vary by jurisdiction. Consult local authorities for acceptable exposure limits in your area.

**Section IX. Physical and Chemical Properties**

<b>PHYSICAL STATE AND APPEARANCE</b>	Liquid.		
<b>MOLECULAR WEIGHT</b>	Not applicable.	<b>COLOR</b>	Colorless.
<b>pH (10% SOLN/WATER)</b>	13	<b>ODOR</b>	Pungent Ammonia odour (Strong.)
<b>BOILING POINT</b>	30°C (86°F)	<b>ODOR THRESHOLD</b>	5 ppm
<b>MELTING POINT</b>	~ -44 °C (-47°F)	<b>TASTE</b>	Not available.
<b>CRITICAL TEMPERATURE</b>	Not available.	<b>VOLATILITY</b>	100% (v/v). 100% (w/w).
<b>SPECIFIC GRAVITY g/cc</b>	0.91- 24% soln (Water = 1)	<b>SOLUBILITY</b>	Easily soluble in cold or hot water.
<b>BULK DENSITY kg/m<sup>3</sup> ; lbs/ft<sup>3</sup></b>	~910 kg/m <sup>3</sup> ; ~7.6 lbs/gal (US); ~9.2 lbs/gal (UK).	<b>DISPERSION PROPERTIES</b>	See solubility in water.
<b>VAPOR PRESSURE</b>	475 mm of Hg (@ 20°C)	<b>WATER/OIL DIST. COEFF.</b>	Not available.
<b>VAPOR DENSITY</b>	0.6 @ 15 °C		

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**Section X. Stability and Reactivity Data**

STABILITY	The product is stable.
INSTABILITY TEMPERATURE	Not available.
CONDITIONS OF INSTABILITY	No additional information.
INCOMPATIBILITY WITH VARIOUS SUBSTANCES	Highly reactive with acids. Slightly reactive with oxidizing agents, reducing agents, metals, alkalis. Non-reactive with combustible materials, organic materials.
CORROSIVITY	Corrosive to copper. Slightly corrosive to mild steel, aluminum, and zinc. Non-corrosive to glass, or 304 or 316 stainless steel.
SPECIAL REMARKS ON REACTIVITY	Copper, aluminum and zinc alloys, acrolein, mineral acids, dimethylsulphate, mercury, chlorine, silver. Hazardous thermal decomposition products are ammonia and oxides of nitrogen.
SPECIAL REMARKS ON CORROSIVITY	Corrosive to brass. Incompatible with copper alloys. Will corrode a wide variety of metals. Contact your sales representative or a metallurgical specialist to ensure compatibility with your equipment.

**Section XI. Toxicological Information**

SIGNIFICANT ROUTES OF EXPOSURE	Ingestion. Inhalation.
TOXICITY TO ANIMALS	See Section II.
SPECIAL REMARKS ON TOXICITY TO ANIMALS	Will release ammonium ions. Ammonia is a toxic hazard to fish. Avoid spills or release to watercourses. Toxic to wildlife and domestic animals. Severe over-exposure can produce lung damage, choking, unconsciousness or death. May be harmful to livestock and wildlife if ingested. Clean up all spilled material to prevent animal exposure.
OTHER EFFECTS ON HUMANS	No additional remarks on the other toxic effects of this product.
SPECIAL REMARKS ON CHRONIC EFFECTS ON HUMANS	Prolonged and/or repeated exposures may cause breathing disorders and/or lung damage.
SPECIAL REMARKS ON OTHER EFFECTS ON HUMANS	No additional remark.

**Section XII. Ecological Information**

ECOTOXICITY	Toxic for humans or animal life. Corrosive to skin and eyes on contact. Severe over-exposure can produce lung damage, choking, unconsciousness or death. May cause severe eye irritation. Will release ammonium ions. Ammonia is a toxic hazard to fish.
BOD and COD	Not available.
PRODUCTS OF DEGRADATION	Not applicable.
TOXICITY OF THE PRODUCTS OF DEGRADATION	The products of biodegradation are as toxic as the original product.
SPECIAL REMARKS ON THE PRODUCTS OF DEGRADATION	No additional remark.

Continued on Next Page

**Section XIII. Disposal Considerations****WASTE DISPOSAL OR RECYCLING**

Recycle to process, if possible. Dispose of in accordance with all applicable federal, provincial, or state and local regulations.

**Section XIV. Transport Information****DOT / TDG CLASSIFICATION**

CLASS 8: Corrosive liquid.

**PIN and Shipping Name**

Proper shipping name: Ammonia solutions, relative density between 0.880 and 0.957 at 15 degrees C in water with more than 10% but not more than 35% ammonia  
PIN Number: UN2672 PG III

**SPECIAL PROVISIONS FOR TRANSPORT**

US DOT: IB3, IP8, T7, TP1

**DOT (U.S.A) (Pictograms)****Section XV. Other Regulatory Information and Pictograms****OTHER REGULATIONS**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): This product is on the Domestic Substances List (DSL), and is acceptable for use under the provisions of CEPA.

**FIFRA Allowable Tolerances:**

Residues of ammonium hydroxide are exempted from the requirement of a tolerance when used as a solvent, cosolvent, neutralizer, or solubilizing agent in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. [Peer Reviewed] 40 CFR 180.1001(c)

**Clean Water Act Requirements:**

Designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. 40 CFR 116.4

**CERCLA Reportable Quantities:**

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 1000 lb or 454 kg (approx 134 USG).

Subject to the threshold determination provisions of the Risk Management Program, 40 CFR Part 68.115 if the concentration of ammonia in the solution is 20% or greater.

**FDA Requirements:**

1. Ammonium hydroxide used as a general purpose food additive in animal drugs, feeds, and related products is generally recognized as safe when used in accordance with good manufacturing or feeding practice. 21 CFR 582.1139
2. Substance added directly to human food affirmed as generally recognized as safe (GRAS).

SARA HAZARD CATEGORY: This product has been revised according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

**Immediate Health**

This product contains the following chemical subject to the reporting requirements of EPCRA Section 313 and 40 CFR 372:

Ammonia (Includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium ions; 10% of total aqueous ammonia is reportable under this listing), CAS# 7664-41-7, 10-35 wt% as anhydrous ammonia (total aqueous ammonia is equal to the quantity of anhydrous ammonia used, 10% of which is reportable, see EPA doc 745-R-00-005)

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986 (CA Health and Safety Code Sec 25249.5):

This product contains no chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations:

WHMIS CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).  
WHMIS CLASS E: Corrosive liquid.

**OTHER CLASSIFICATIONS**

**HCS (U.S.A.)** HCS CLASS: Corrosive liquid  
HCS CLASS: Toxic.

**DSCL (EEC)** R34- Causes burns.  
R50- Very toxic to aquatic organisms.

**National Fire Protection Association (U.S.A.)**

Hazards presented under acute emergency conditions only:

Health



**Fire Hazard**

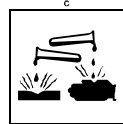
**Reactivity**

**Specific Hazard**

**TDG (Pictograms - Canada)**



**DSCL (Europe) (Pictograms)**



**ADR (Europe) (Pictograms)**



**Section XVI. Other Information**

**REFERENCES**

- Transportation of Dangerous Goods Act and Clear Language Regulations, current revision.
- Canada Gazette Part II, Vol. 122, No. 2 Registration SOR/88-64 31 December, 1987 Hazardous Products Act "Ingredient Disclosure List".
- Domestic Substances List, Canadian Environmental Protection Act.
- 29 CFR Part 1910
- 33 CFR Parts 151, 153, 154, 156
- 40 CFR Parts 1-799
- 46 CFR Part 153
- 49 CFR Parts 1-199
- American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances, 2009.
- NFPA 704, National Fire Codes Online, National Fire Protection Association, current edition at time of MSDS preparation.
- Corrosion Data Survey, Sixth Edition, 1985, National Association of Corrosion Engineers
- ERG2008 Emergency Response Guidebook
- CHRIS Hazardous Chemical Data: U.S. Coast Guard, Washington, D.C.
- HSDB: Hazardous Substances Data Bank. National Library of Medicine, Bethesda, Maryland
- IRIS: Integrated Risk Information System. U.S. Environmental Protection Agency, Washington, D.C.
- NIOSH: Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health, Cincinnati, Ohio

-OHM/TADS: Oil and Hazardous Materials Technical Assistance Data System  
U.S. Environmental Protection Agency, Washington, D.C. ;  
-RTECS®: Registry of Toxic Effects of Chemical Substances National Institute for  
Occupational Safety and Health, Cincinnati, Ohio  
-The Fertilizer Institute Product Testing Program Results, March 2003  
-Alberta Workplace Health and Safety, Occupational Health and Safety Code 2009

**OTHER SPECIAL  
CONSIDERATIONS**

Three year review. Reference information revised.

**FOR FURTHER SAFETY, HEALTH, OR  
ENVIRONMENTAL INFORMATION ON  
THIS PRODUCT, CONTACT**

**AGRIUM  
Wholesale Environment, Health and Safety  
Telephone (780) 998-6906 or Fax (780) 998-6677**

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