Material Safety Data Sheet

Revision Issued: 2/22/2012 Supercedes: 4/15/2010 First Issued: 1/02/1986

Section I - Chemical Product And Company Identification

Product Name: Aqua Ammonia Solutions

CAS Number: See Section II HBCC MSDS No. CA13226

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Section II - Composition / Information On Ingredients

For Ammonia Solutions 14-19.5%

Chemical Name	CAS Number	%
Ammonium Hydroxide	1336-21-6	14-19.5

For Ammonia Solutions 20-30%

Chemical Name	CAS Number	%
Ammonia (conc. 20% or greater)	7664-41-7	20-30

See Section VIII for exposure guidelines

Section III - Hazard Identification

Summary of Acute Health Hazards

Ingestion: May cause corrosion to the esophagus and stomach with perforation and peritonitis. Ingestion causes burning pain in mouth, throat, stomach, and thorax, constriction of throat, and coughing. This is soon followed by vomiting of blood or by passage of loose stools containing blood. Ingestion of 3-4 ml may be fatal.

Inhalation: If inhaled, will cause nausea, vomiting, breathing difficulty, and convulsions. Shock or loss of consciousness may result. Brief exposure to 5000 ppm may be fatal.

Skin: **Absorption**; Ammonia, because of its alkalinity and water solubility, tends to break down and disrupt the outer cell layers, permitting rapid penetration. Even so, ammonia is not a systemic poison and the effects will be limited to local effects.

Contact; Causes smarting of the skin and first-degree burns on short exposure. May cause second-degree burns on long exposure.

Eyes: Vapor is irritating to the eyes. Liquid will cause burns.

Signs and Symptoms of Exposure: Burning of the eyes, conjunctivitis, skin irritation, swelling of the eyelids and lips, dry red mouth and tongue, burning in the throat, and coughing. In more severe cases of exposure, difficulty in breathing, signs and symptoms of lung congestion, and, ultimately, death from respiratory failure due to pulmonary edema may occur.

Effects of Overexposure: Irritation and possible burns of the skin and mucous membranes. Headache, salivation, nausea, and vomiting. Difficult or labored

breathing and cough with bloody mucous discharge. Bronchitis, laryngitis, hemoptysis, and pulmonary edema or pneumonitis. Ulceration of the conjunctiva and cornea, and corneal and lenticular opacities. Damage to the eyes may be permanent.
Medical Conditions Generally Aggravated by Exposure: Ammonia is a respiratory irritant. Persons with impaired pulmonary function may be at increased risk from exposure.

Section IV - First Aid Measures

Ingestion: **Do Not Induce Vomiting**. If person is conscious, give large quantities of water and, if possible, diluted vinegar, lemon juice, orange juice, or other citric juices to neutralize the ammonia. Delay may cause perforation of esophagus or stomach. OBTAIN MEDICAL ATTENTION.
Inhalation: Remove victim to fresh air. Give oxygen if breathing is difficult. If breathing has stopped, start artificial respiration. Keep victim calm and resting. OBTAIN MEDICAL ATTENTION.
Skin: Apply water immediately to exposed areas of skin and continue for at least 30 minutes. Remove contaminated clothing while continuing to apply water. Do not apply salves or ointments to affected areas. OBTAIN MEDICAL ATTENTION.
Eyes: Immediately flush with flowing water for at least 30 minutes with the eyelids held apart. OBTAIN MEDICAL ATTENTION.

Section V - Fire Fighting Measures

Flash Point: N/A

Autoignition Temperature:
651°C; 1204°F

Lower Explosive Limit:
16% by volume Ammonia gas

Upper Explosive Limit:
25% by volume Ammonia gas

Unusual Fire and Explosion Hazards: The presence of oil or other combustible materials will increase the fire hazard. The explosive (flammable) range of ammonia is broadened by a mixture of oxygen replacing air, and by temperature and pressure higher than atmospheric.

Extinguishing Media: Water spray or fog type streams. Chemical or CO_2 should be used on small fires only.

Special Firefighting Procedures: Stop the flow of liquid. Use water to keep fire exposed containers cool and to protect men affecting the shut off. Wear self-contained breathing apparatus and full protective clothing. Approach fire upwind and evacuate area downwind if needed.

Section VI - Accidental Release Measures

Stop the flow. Wear self-contained breathing apparatus and full protective clothing. Approach spill from upwind and evacuate area downwind. Prevent runoff from entering streams, drinking water supply or sewers. Dike to contain spill. Dilute with water, if necessary to reduce ammonia vaporization. Can be neutralized with dilute phosphoric or sulfuric acids. Vinegar will effectively neutralize small spills of aqua ammonia.

Section VII - Handling and Storage

Avoid heating containers of aqua ammonia. Avoid storing in close proximity to strong acids. Avoid contact with skin and eyes. Avoid inhalation of vapors.
Other Precautions: Harmful to aquatic life in very low concentrations. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Do not

contaminate any body of water by direct application, cleaning of equipment or disposal.

Section VIII - Exposure Controls/Personal Protection

Exposure Controls

Engineering Controls: Local exhaust is essential. Spark-proof fans desirable with mechanical ventilation. Ducts should be located at ceiling level and lead upwards to the outside. Local exhaust must be adequate to reduce ammonia concentration below 25 ppm. Eyewash fountain and safety shower should be available in the work area.

Work/Hygienic Practices: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands before eating, drinking, or using restroom. Do NOT place food, coffee or other drinks in the area where dusting or splashing of solutions is possible.

Exposure Guideline(s): Ammonium Hydroxide: CAS Number 1336-21-6, Exposure Limits (TWAs) in Air: ACGIH TLV: 25 ppm; OSHA PEL: 50 ppm; STEL: 35 ppm | Ammonia (concentration 20% or greater): CAS Number 7664-41-7, Exposure Limits (TWAs) in Air: ACGIH TLV: 25 ppm; OSHA PEL: 50 ppm; CAL-OSHA PEL: 25 ppm; STEL: 35 ppm

Personal Protection

Personal Protection Equipment (PPE): Unless ventilation is adequate to keep airborne concentrations below the exposure standard, wear approved respiratory protection such as an ammonia canister mask or an approved air supplied respirator. Canister or cartridge type masks must not be used above their exposure limits. From 0-199 ppm, a cartridge type 1/2 mask respirator is needed. From 200-299 ppm a type "N" gas mask with full face piece is needed. Over 300 ppm a self-contained breathing apparatus (SCBA) is required.

Protective Clothing: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene and nitrile rubber are recommended materials. Polyvinyl alcohol is not recommended.

Eye Protection: Tight fitting chemical safety and splash-proof goggles and/or a splash-proof faceshield must be worn if there is a likelihood of exposure. Persons subject to ammonia exposure must not wear contact lenses.

Section IX - Physical and Chemical Properties

Physical State: Liquid	**pH:** 12-14
Melting Point/Range: N/A	**Boiling Point/Range:** 82.8-140.4°F; 28.22-60.22°C @ 14.7 PSIA
Appearance/Color/Odor: Colorless liquid with pungent odor	
Solubility in Water: 100%	**Vapor Pressure (mmHg):** 268-720 @ 80°F; 26.67°C
Vapor Density (Air=1): 0.6 @ 32°F; 0°C	**Molecular Weight:** N/A

Specific Gravity (Water=1) @ 60°F; 15.5°C by % of Solution:

0.8957 (30%)-0.9261 (20%)	Approx. 0.9459 (14%)	Approx. 0.9425 (15%)	0.92 (19%)

Weight/Gallon (Lbs.) by % of Solution:			
7.46-7.71 (20-30%)	7.88 (14%)	7.85 (15%)	7.66 (19%)

Baume' @ 60°F by % of Solution:			
21.17 (20%) - 26.31 (30%)	18.02 (14%)	18.55 (15%)	20.65 (19%)
% Volatiles: 14-30%	**How to detect this compound:** Smell. The odor threshold for Aqua Ammonia is 1-5 ppm.		
VOC: Approx. 0 g/L			

Section X - Stability and Reactivity

Stability: Stable **Hazardous Polymerization:** Will not occur

Conditions to Avoid: Heat, open flames, and electrical equipment and fixtures which are not vapor-proof or grounded.

Materials to Avoid: Contact with mercury, chlorine, bromine, iodine, calcium, silver oxide, or hypochlorite can form explosive compounds.

Hazardous Decomposition Products: Ammonia is lightly reactive, easily undergoing oxidation, substitution and addition reactions. Combustion of ammonia will yield small amounts of nitrogen and water.

Section XI - Toxicological Information

Toxicity by Ingestion: Oral rat, LD50: 350 mg/kg

Section XII - Ecological Information

N/A

Section XIII - Disposal Considerations

Consult Federal, State, or Local authorities for proper disposal procedures.

Section XIV - Transport Information

DOT Proper Shipping Name: Ammonia Solution or Ammonium Hydroxide
DOT Hazard Class/ I.D. No.: 8, UN2672, III

Section XV - Regulatory Information

Toxicity by Ingestion: Oral rat, LD50: 350 mg/kg
IDLH Value*: 300 ppm *The Immediately Dangerous to Life and Health Value
Reportable Quantity: 1000 Pounds (454 Kilograms) (134 Gal.)

Maximum use level for Ammonium Hydroxide under NSF/ANSI Standard 60		
Ammonium Hydroxide 19%	Maximum use	26 mg/L
Ammonium Hydroxide 20%	Maximum use	25 mg/L
Ammonium Hydroxide 29.45%	Maximum use	17 mg/L
Ammonium Hydroxide 26° be	Maximum use	17 mg/L
Ammonium Hydroxide 24.5%*	Maximum use	20 mg/L
*NSF certification for 24.5% applies to Aqua Ammonia produced at the San Jose facility only.		

NFPA Rating: Health - 3; Flammability - 1; Instability - 0
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
NFPA Rating is for Ammonia, Anhydrous, Liquefied Gas only. Ammonia Solutions are not rated by the NFPA (National Fire Protection Association).
Carcinogenicity Lists: NTP: No **IARC Monograph:** No **OSHA Regulated:** Yes

Section 313 Supplier Notification: This product contains the following toxic chemical(s) subject to the reporting requirements of SARA TITLE III Section 313 of the Emergency Planning and Community Right-To Know Act of 1986 and of 40 CFR 372:

CAS #	Chemical Name	% By Weight
1336-21-6	Ammonium Hydroxide	14-19.5%
7664-41-7	Ammonia (conc 20% or greater)	20-30%

Section XVI - Other Information

Synonyms/Common Names: Ammonium Hydroxide; Aqueous Ammonia; Water Ammonia; Aqua Ammonia; Ammonia Solutions
Chemical Family/Type: Inorganic Bases
Sections changed since last revision: XV

IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.