

MATERIAL SAFETY DATA SHEET

Aqua Ammonia

Section 01 - Product And Company Information

Product Identifier Aqua ammonia

Product Use Fertilizer, extracting metals from their ores, hydrogen sulphide scrubber, manufacturing (plastics, fibers, resins, explosives, detergents, pesticides, pharmaceuticals, ammonium compounds, other chemicals)

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Preparation Date January 11, 2013

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Section 02 - Composition / Information on Ingredients

Hazardous Ingredients Ammonium Hydroxide 10-35%

CAS Number Ammonium Hydroxide 1336-21-6

Synonym (s) Ammonia aqueous, ammonia solution, ammonia water, ammonium hydrate, aqua ammonia, aqueous ammonia, spirit of hartshorn

Section 03 - Hazard Identification

- Inhalation**..... Ammonia gas released from ammonium hydroxide solutions is a severe respiratory tract irritant. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Over-exposure by inhalation may cause respiratory irritation.
- Skin Contact / Absorption**..... Ammonium hydroxide is extremely corrosive and is capable of causing severe burns with deep ulceration, blisters and permanent scarring.
- Eye Contact**..... Ammonium hydroxide is extremely corrosive and is capable of causing severe burns with deep ulceration and permanent scarring. Damage can range from severe irritation and mild scarring to blistering, disintegration, ulceration, severe scarring, clouding of the cornea and possible blindness.
- Ingestion**..... Will cause burns to mouth, throat and stomach. If ingested, vomiting, diarrhea, collapse and death can result.
- Exposure Limits**..... ACGIH/TLV-TWA: 25ppm (8 hrs)
ACGIH/TLV-STEL: 35ppm (8 hrs)
Alberta OEL-TWA: 25ppm
Alberta OEL-STEL: 35ppm
OSHA/PEL-TWA: 50ppm (8 hrs)

Section 04 - First Aid Measures

- Inhalation**..... Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. Do not allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Give CPR if there is no immediately transport victim to an emergency care facility.
- Skin Contact / Absorption**..... Avoid direct contact with this chemical. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes, leather goods (ie: watchbands, belts). Flush contaminated area with lukewarm, gently flowing water for at least 60 minutes. Do not interrupt flushing. If necessary, keep the emergency vehicle waiting. Transport victim to an emergency care facility immediately. Discard contaminated clothing, shoes and leather goods.
- Eye Contact**..... Check for and remove any contact lenses. Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.



Ingestion..... Never give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. Do not induce vomiting. Have victim drink 240-300mL of water to dilute material in the stomach. If milk is available, it may be administered after the water has been given. If vomiting occurs naturally, repeat administration of water. Quickly transport victim to an emergency care facility.

Additional Information..... Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation contact.

Section 05 - Fire Fighting Measures

Conditions of Flammability..... Non flammable in presence of open flame, sparks and static discharge. May be combustible at high temperatures.

Means of Extinction..... If ammonia vapours or gas is burning, use dry chemical powder or carbon dioxide for small fires and water spray, fog or foam for large fires. Otherwise, use extinguishing media appropriate to the surrounding fire conditions.

Flash Point..... Not available

Auto-ignition Temperature..... 651°C (ammonia gas)

Upper Flammable Limit Not available

Lower Flammable Limit..... Not available

Hazardous Combustible Products... Decomposition products may include oxides of nitrogen. Ammonia gas decomposes into hydrogen and nitrogen at about 450-500°C. It has also been reported that the main products of combustion in air (at/or above 780°C) are nitrogen and water, with small amounts of nitrogen dioxide and ammonium nitrate.

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.



Explosion Hazards..... Concentrated solutions of ammonia give flammable vapors when the solution is between certain temperatures. Above 49°C, no flammable vapors are produced by ammonia solutions of any concentration. Ammonia gas is generally not considered a serious fire or explosion hazard because ammonia-air mixtures are difficult to ignite and a relatively high concentration of the gas is required. However, a large and intense energy source may cause ignition and/or an explosion, particularly in a confined space. Containers may rupture violently due to overpressurization if exposed to fire or excessive heat for a sufficient period of time. This rupture may release flammable and toxic gases.

Section 06 - Accidental Release Measures

Leak / Spill..... Small:
Carefully dilute with water or cover with dry earth, sand or other non-combustible material. Collect material and place it into covered plastic containers for later disposal. Flush area with water.

Large:
Wear appropriate protective equipment as outlined in Section 8. Prevent liquid from entering sewers or waterways. Dike with inert material (sand, earth, etc.). Stop or reduce leak if safe to do so. Consider in site neutralization and disposal. Comply with Federal, Provincial and local regulations on reporting releases.

Deactivating Materials..... If necessary, neutralize residue from small spills with dilute solution of acetic acid.

Section 07 - Handling and Storage

Handling Procedures..... Avoid contact with eyes, skin and clothing. Do not ingest. Do not breathe vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Avoid contact of spilled material and runoff with soil and surface waterways.

Storage Requirements..... Store in a cool, dry, well-ventilated area, out of direct sunlight. Do not store below ground level or in confined spaces. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Keep storage area separate from work areas. Post warning signs. Inspect periodically for damage or leaks. Store away from incompatible materials such as chlorine, acids and copper. Always store in original labeled container, or in the type of container recommended by the manufacturer/supplier. Protect the label and keep it visible. Keep containers tightly closed when not in use and when empty. Protect from damage. Store empty containers separately. Empty containers may contain hazardous residues.

Section 08 - Personal Protection and Exposure Controls

Protective Equipment

- Eyes**..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.
- Respiratory**..... Concentrations up to 250ppm, chemical cartridge respirator with cartridge(s) to protect against ammonia; or supplied-air respirator. Up to 300ppm, SAR operated in a continuous-flow mode; or powered air-purifying respirator with cartridge(s) to protect against ammonia; or full-facepiece chemical cartridge respirator with cartridge(s) to protect against ammonia; or gas mask with canister to protect against ammonia; or full-facepiece SCBA; or full-facepiece SAR.
- Gloves**..... Impervious gloves of chemically resistant material (butyl rubber, neoprene or PVC) should be worn at all times. Wash contaminated clothing with soap and water, dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing with soap and water, dry thoroughly before reuse.
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

Engineering Controls

- Ventilation Requirements**..... Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided. Supply sufficient replacement air to make up for air removed by exhaust systems. Due to the high potential hazard associated with ammonium hydroxide, stringent control measures such as enclosure or isolation may be necessary for large-scale handling operations. For large-scale handling operations, use non-sparking, corrosion-resistant ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas of use.
- Other**..... Emergency shower and eyewash should be in close proximity.

Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Clear, colourless liquid with a highly irritating odour
- Odor Threshold**..... 0.043 to 5 ppm at 30%



Specific Gravity (Water=1)..... 0.8974 at 29.40%
Vapor Pressure (mm Hg, 20C)..... 475mm Hg at 30%
Vapor Density (Air=1)..... 0.618 at 15°C (30%)
Evaporation Rate..... Not available
Boiling Point..... 27.2°C at 29.40%
Freeze/Melting Point..... -77°C at 27-30%
pH..... 13 at 10%
Water/Oil Distribution Coefficient.... Not available
Bulk Density..... Not available
% Volatiles by Volume..... 100%
Solubility in Water..... Miscible in water
Molecular Formula..... NH₄OH
Molecular Weight..... 35.05

Section 10 - Stability and Reactivity

Stability..... Normally stable under normal conditions. Ammonia gas may be given off under normal conditions.
Incompatibility..... Oxidizers, salts of heavy metals (silver, gold, lead, mercury, zinc), chlorine, copper, brass, aluminum, dimethylsulphate, acrolein.
Hazardous Products of Decomposition.. Ammonia and oxides of nitrogen.
Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Severe irritant
Sensitization..... Numerous animal studies confirm that the respiratory system can be severely affected following inhalation exposures to ammonia.



- Chronic/Acute Effects**..... Acute:
Very corrosive to eyes, skin, mouth and throat when in contact. Highly irritating to lungs due to inhalation.
- Chronic:
Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. People repeatedly exposed to ammonia may develop a tolerance (or acclimatization) to the irritating effects after a few weeks. Tolerance means that higher levels of exposure are required to produce effects earlier seen at lower concentrations. Owing to its corrosive nature, repeated or prolonged skin contact would be expected to cause drying, cracking, and inflammation of the skin (dermatitis).
- Synergistic Materials**..... Not available
- Animal Toxicity Data**..... LC₅₀(inhalation, rat, 4 hrs): 3670ppm
LD₅₀(oral, rat): 350mg/kg
LC_{Lo}(inhalation, human): 5000ppm
- Carcinogenicity**..... Not considered to be carcinogenic as per IARC, NTP, OSHA, and ACGIH.
- Reproductive Toxicity**..... Not available
- Teratogenicity**..... Not available
- Mutagenicity**..... Insufficient details are available to evaluate a report of mutagenicity in live animals (chromosomal changes in rats exposed to 28 ppm for 16 weeks). In two studies using bacteria, ammonium hydroxide produced weak/doubtful results or produced positive results, but only at concentrations that caused significant cell death making the results unreliable. In general, chemicals with a high pH, like ammonium hydroxide, have caused mutagenic effects in bacteria, but only at concentrations that are toxic to the cells.

Section 12 - Ecological Information

- Fish Toxicity**..... LC50(48 hrs, Bluegill sunfish): 0.024-0.093mg/L
LC50(96 hrs, Fathead minnow): 8.2mg/L
EC50(48 hrs, Daphnia magna): 0.66mg/L
- Biodegradability**..... Products of biodegradation (nitrogen oxides) are more toxic than original product.
- Environmental Effects**..... Ammonia is toxic to fish and other wildlife. Avoid spills and/or release into water sources.



Section 13 - Disposal Consideration

Waste Disposal..... Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

TDG Classification

Class..... 8

Group..... III

PIN Number..... UN 2672

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment and ensure all caps, valves, or closures are secured in the closed position.

Section 15 - Regulatory Information

WHMIS Classification.....D1, E

NOTE: THE PRODUCT LISTED ON THIS MSDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS MSDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for disinfection and oxidation at a maximum dosage of 1mg/L (NOTE: NSF certification is only applicable for bulk load shipments of 29% aqua ammonia).

Section 16 - Other Information

Note: The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

Attention: Receiver of the chemical goods / MSDS coordinator

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.



ClearTech Industries Inc. - Locations

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Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 th Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	19 Peters Ave, North Corman Park	S7K 1V7	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

24 Hour Emergency Number - All Locations - 306-664-2522