

Emergency Response

Personnel responding to the accidental release of a hazardous material must be trained in accordance with HAZWOPER regulation 29 CFR 1910.120. The following are suggested steps to be followed in the event of an accidental release of aqua ammonia:

1. Report the release immediately to the National Response Center (1,000 lbs. Or more in any 24-hour period). Report to state and local authorities as required.
2. Alert all on-site personnel and shut down all aqua ammonia operations.
3. Account for all on-site personnel.
4. Administer first aid to injured personnel.
5. Evaluate the emergency and assess the possible need for an evacuation.
6. Contact off-site emergency responders as necessary.
7. Coordinate with off-site responders.
8. Direct site activities.
9. Identify the source of the aqua ammonia leak.
10. Isolate and control the source of leak.
11. Record site events (ongoing).
12. Monitor the leak (ongoing).

The application of a water fog to absorb ammonia vapors immediately downwind of a spill is an effective mitigation tool. Determine the potential flow pattern of the ammonia-water solution beforehand. If necessary, create proper pathways for retaining the dilute ammonia-water solution.

Environmental

Properly designed containment systems must be used for confining aqua ammonia (ammonium hydroxide) in the event of a large spill. Spills should not be washed into ground water. Release into sewers is not permitted without appropriate approvals and dilution. For information, contact your local, state and federal regulatory agencies. Secure regulatory and/or sanitary district approval prior to disposal into a sewer. For hazardous waste regulations, contact the federal RCRA Hotline at (800) 424-9346.

Aqua ammonia in concentrations as low as 5 ppm can be harmful to aquatic life. Aqua ammonia is a regulated material and reporting of any release may be required.

Safety

Refer to the Material Safety Data Sheet for Airgas aqua ammonia for more detailed safety information.

Primary Hazards

Aqua ammonia is an alkaline material and reacts corrosively with human tissue in varying degrees depending on concentration and the time duration of exposure. Ammonia vapors from aqua ammonia can be suffocating and irritating to mucous membranes and lung tissue. Skin contact can cause severe irritation and burns. Eye contact with aqua ammonia may be severely irritating; ammonia vapor contact with eyes may be mildly irritating. Ingestion can cause vomiting, nausea and corrosive burns to the esophagus and stomach. Ammonia is not listed as a carcinogen by IARC, NPT or OSHA.

The easily recognized odor of aqua ammonia provides adequate warning of its presence.

Aqua ammonia is not flammable. However, ammonia vapors present in aqua ammonia storage and handling equipment can ignite in the presence of a flame or spark at about 1200°F. The flammability range of ammonia vapor is approximately 16-25% of ammonia in air by volume. The NFPA hazard designation for anhydrous ammonia is 3-1-0 (Health =3; Flammability = 1; Reactivity =1).

Before welding or cutting, aqua ammonia tanks and/or piping must be completely purged of all ammonia. Purge until no odor can be detected and continue the purging during the welding or cutting maintenance procedure.

Other Hazards

Aqua ammonia may react with halogens such as bromine and chlorine, with silver or with hypochlorites to form explosive and/or toxic compounds.

Ammonia vapor begins to dissociate into nitrogen and highly flammable hydrogen at about 840°F if a suitable catalyst is present. Iron pipe is one such catalyst.

Aqua ammonia will react with many organic and inorganic acids to form salts. These reactions are usually exothermic, i.e., heat is generated.

Human Physiological Effects

Aqua ammonia is not a cumulative metabolic poison. Ammonia is actually an important compound in life processes. Human blood contains about 1 ppm ammonia; humans produce about 4 grams of ammonia per day.

Depending on concentration and time, the effects of exposure to ammonia vapor vary from none or only mild irritation, to obstruction of breathing from laryngeal and bronchial spasm, to edema and severe damage of the mucosa membranes of the respiratory tract with possible fatal results.

Contact of the skin with aqua ammonia can result in a caustic burn.

Exposure levels of ammonia vapor which are tolerated by some persons may produce adverse reactions in others. People with chronic respiratory disease or undue sensitivity to ammonia should not be exposed to it. The table below indicates human physiological response to the inhalation of various concentrations of ammonia vapor in air.

Physiological Effects Of Ammonia Vapor

<i>Effect</i>	<i>PPM Ammonia in Air by Volume</i>
Least perceptible odor	5 ppm
Readily detectable odor	20-25 ppm
No discomfort or impairment of health for prolonged exposure	50-100 ppm
General discomfort and eye-tearing; No lasting effect on short exposure	150-200 ppm
Severe irritation of eyes; ears, nose and throat; No lasting effect on short exposure	400-700 ppm
Coughing, bronchial spasms	1,700 ppm
Dangerous, less than _-hour exposure may be fatal	2,000-3,000 ppm
Serious edema, strangulation, asphyxia, rapidly fatal	5,000-10,000 ppm
Immediately fatal	>10,000 ppm

(From Anhydrous Ammonia G-2-1995, Eighth Edition, 1995, Compressed Gas Association, Inc.)

The odor threshold of ammonia is from about 5

ppm to 50 ppm. This low threshold level typically provides more than ample warning of its presence.

Exposure Limits For Vapor Ammonia

OSHA regulations have established a Permissible Exposure Limit (PEL) of 50 ppm of ammonia in air by volume as a time-weighted average (TWA), the definition for which is the average exposure in any 8-hour work shift of a 40-hour work week,

The American Conference of Government and Industrial Hygienists (ACGIH) established an exposure limit of 25 ppm ammonia in air by volume as a time-weighted average (TWA).

ACGIH also established a 15-minute short term exposure limit (STEL) of 35 ppm. An STEL is a 15-minute time-weighted average which cannot be exceeded at any time during a work day. NIOSH has set 300 ppm of ammonia as it immediately dangerous to life and health (IDLH) value.

Ammonia vapor is substantially lighter than air. This property makes ventilation an important tool in preventing accumulations which may exceed these limits.

Personal Protective Equipment

Persons working with aqua ammonia under routine circumstances of operation and maintenance should wear chemical splash-proof goggles and rubber gauntlet gloves with rolled-up cuffs. A full face shield may be worn over goggles for additional protection, but not as a substitute for the goggles. DO NOT wear contact lenses.

Additional personal protective equipment includes:

- * Long-sleeve shirt and full-length pants
- * Hard hat with full face shield
- * Waterproof boots made with special grip soles
- * Raincoat

Emergency Protective and Safety Equipment

Every location storing or handling aqua ammonia should have readily-available and freely-accessible emergency protective and safety equipment as required by federal, state and local government regulations. The location of this equipment should be well identified by appropriate signs.

Depending on the size and nature of the aqua ammonia use, emergency protective and safety equipment may include one or more of the following:

Safety Shower:

Parts of the body contacted by aqua ammonia must be flooded immediately with large quantities of water. An emergency safety shower, eye wash fountain or other source of clean water can be used for this purpose. Such a source should be protected from freezing in cold weather.

Respiratory Devices:

1. Two full-face gas masks with industrial-size ammonia canisters approved by MSHA/NIOSH and a spare canister for each. Refer to the manufacturer's label to determine the time allowed at specific breathing rates and various ammonia concentrations. Use of a gas mask for purposes other than escape is not recommended in ammonia vapor concentrations exceeding the IDHL level of 300 ppm. Canisters are stamped with expiration dates by the manufacturer. Do not use after the expiration date. The use of gas mask requires a written training and maintenance program.

2. A self-contained air breathing apparatus of a pressure demand type should be used for protection in emergency situations where ammonia concentrations are unknown or may exceed the concentration for which a gas mask is rated for entry purposes. The use of a self-contained breathing apparatus requires a written training and maintenance program.

A fire hose with fog nozzle is useful for controlling ammonia vapors originating from an accidental release of aqua ammonia. Control the vapors downwind as they leave the area.

Regulations

OSHA

The OSHA Hazard Communication Rule, 29 CFR 1910.1200 applies to aqua ammonia. A hazard communication label should be placed on any container of aqua ammonia.

Aqua ammonia is subject to OSHA Process Safety Management regulations if the concentration is 20% or greater and the quantity maintained on site is 20,000 lbs. or greater.

DOT

See Appendix C, pages 43-46.

EPA

Aqua ammonia is subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA), Section 313 of Title

III and 40 CFR Part 370. The Emergency Planning and Community Right-To-Know Act (EPCRA) Section 302 does not list aqua ammonia as an extremely hazardous substance. Section 311/312 indicates a category of Immediate (Acute) Health Hazard. Section 313 does identify it as a toxic chemical.

Releases of 1,000 lbs. or more of aqua ammonia in any 24-hour period must be reported immediately to the National Response Center in Washington at (800) 424-8802 (CERCLA/Superfund, 40 CFR Parts 117 and 302). State and local agencies may also require reporting.

Aqua ammonia is listed in the toxic Substances Control Act (TSCA).

Aqua ammonia is not listed under California Proposition 65 as either a reproductive hazard or carcinogen.

Aqua ammonia is subject to EPA's Risk Management Plan (40 CFR Part 68) if the concentration is 20% or greater and the quantity maintained on-site is 20,000 lbs. or greater.

The Consumer Product Safety Commission has required in 16 CFR 1500.129 that any ammonium hydroxide consumer product containing 5% or more ammonia bear a POISON label.