



What is Ammonia Used For, And How to Protect Against It

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Known for its strong, pungent smell and chemical versatility, Ammonia has been a critical player in the global industrial landscape. About 80% of the Ammonia produced in industry manufacturing is used in agriculture as fertilizerⁱ. It is used in a myriad of applications, such as refrigerant gas, water purification, and in the manufacture of pharmaceuticals, plastics, explosives, fabrics, pesticides, dyes, and even household cleaning supplies. As the global population soars and the demand for food and commercial products increases, so does the need for Ammonia. Consequently, the management and storage of Ammonia, its corrosive properties, and its potential to create explosive combinations have contributed to escalating environmental and safety hazards, leading to a steady rise in industrial accidents worldwide. This article provides an overview of what Ammonia is, what it is typically used for, how it can potentially endanger people, and how to protect against it.

What is Ammonia?

First identified by the ancient Egyptians in 450 BC and later isolated by Joseph Priestley in 1774, Ammonia's history is a rich tapestry woven into the fabric of scientific discovery. Sourced initially from organic matters like urine and dung, the 20th century introduced a more efficient means of production - the Haber-Bosch process, allowing Ammonia to be synthesized on a colossal scale to feed the world's ever-growing needs.



As a colorless gas at room temperature, Ammonia (NH_3) comprises one part nitrogen and three parts hydrogen and is one of the most commonly produced industrial chemicals in the United Statesⁱⁱ. Ammonia also plays a crucial role in numerous biological functions, acting as the foundation for synthesizing amino acids and nucleotides. The natural breakdown of organic materials, encompassing plant life, animals, and animal waste, also contributes to the production of Ammonia. Some distinctive chemical/physical properties of Ammonia include:

- Ammonia presents itself as a colorless gas with a strong, suffocating smell that is particularly irritating at room temperature.
- When in its pure state, it is referred to as anhydrous Ammonia and exhibits hygroscopic tendencies, meaning it readily attracts moisture.
- Its properties are alkaline in nature, and it possesses corrosive qualities.
- Ammonia gas readily dissolves in water, resulting in the formation of ammonium hydroxide - a corrosive solution with weak base properties.
- Ammonia gas can be easily subjected to compression, forming a transparent liquid under high pressure.
- Typically, Ammonia is transported as a pressurized liquid within steel canisters.
- Although Ammonia itself is not highly combustible, its containers may potentially explode if subjected to elevated temperatures.

How is Ammonia used?

About 90% of the Ammonia produced worldwide is used in fertilizer to help sustain food production for billions of people worldwideⁱⁱⁱ. It is also used in a myriad of applications, such as refrigerant gas, to purify water, and in the manufacture of pharmaceuticals, plastics, explosives, fabrics, pesticides, dyes, and even household cleaning supplies.

Ammonia is a common ingredient in numerous cleaning products for household and industrial use. Household cleaning solutions typically contain between 5 and 10% Ammonia, achieved by introducing Ammonia gas into water. In contrast, industrial Ammonia solutions are more concentrated, often exceeding 25%, which makes them notably corrosive.



Ammonia in Fertilizer

Ammonia is a fundamental building block for [ammonium nitrate fertilizer](https://www.tfi.org/sites/default/files/documents/Ammoniafactsheet.pdf) (<https://www.tfi.org/sites/default/files/documents/Ammoniafactsheet.pdf>), which releases nitrogen, an essential nutrient for growing farm crops by enhancing soil fertility, fostering healthy plant growth, and improving crop yield. It is a critical component of the nitrogen cycle within the ecosystem, generated in the soil through various bacterial activities. The production of food crops naturally depletes soil nutrient supplies, and to maintain healthy crops, farmers rely on fertilizer (<https://www.fertilizerreport.org/>) to keep their soils productive. Fertilizers can also help increase levels of essential nutrients (<https://www.tfi.org/our-industry/intro-to-fertilizer/nutrient-science>) like zinc, selenium, and boron in food crops.



Ammonia in Industrial/Manufacturing Uses

Beyond the farmlands, Ammonia is vital in making coolant in refrigeration and air-conditioning systems, providing efficient cooling in industries and homes. Ammonia can draw substantial amounts of heat from its surrounding environment when used as refrigerant gas and in air-conditioning systems.

Ammonia also serves various purposes, such as purifying water supplies and acting as a fundamental component in producing pharmaceutical products, plastics, explosives, textiles, pesticides, and dyes. And, Ammonia finds usage in waste and wastewater management, cold storage facilities, rubber manufacturing, the pulp and paper industry, and the food and beverage sector, functioning as a stabilizer, neutralizer, and nitrogen source.



Ammonia in Household Cleaning Products

Ammonium hydroxide, often recognized as household Ammonia, is a component in numerous [domestic cleaning products](#) used to clean a wide range of surfaces, from tubs, sinks, and toilets to countertops and tiles. Ammonia is particularly adept at dissolving domestic grime or stains originating from animal fats or vegetable oils, like cooking grease or wine spills. Given its rapid evaporation property, it is frequently used in glass cleaning solutions to prevent streak formation.

Caution Ahead: How You May Be Exposed to and Affected by Ammonia

Most individuals encounter Ammonia by breathing in the gas or its vapors. Given that Ammonia naturally occurs and is frequently found in cleaning supplies, these are common sources of exposure. Its prevalent usage in agricultural, industrial, and commercial settings increases the risk of exposure, either through unintentional release or a deliberate act of terrorism.

As anhydrous Ammonia gas is lighter than air, it typically rises and scatters, preventing its accumulation in low-lying regions. Nonetheless, when it encounters moisture (such as in high humidity conditions), the gas condenses into vapors denser than air. These heavier vapors have the potential to creep along the ground or seep into poorly ventilated, low-lying areas, leading to possible exposure.



How to Recognize Symptoms of Ammonia Exposure

Upon exposure to Ammonia gas, individuals may experience a variety of symptoms. These can range from minor irritations to severe health conditions depending on the concentration and duration of exposure. Symptoms of Ammonia exposure include:

- **Eye Contact:** If Ammonia gas has contacted your eyes, immediately rinse them with water for at least 15 minutes. Don't forget to remove any contact lenses if you wear them. Seek immediate medical attention.
- **Inhalation:** If you've inhaled Ammonia, get to fresh air as quickly as possible. Try to breathe normally and stay calm. Seek immediate medical attention.
- **Skin Contact:** If your skin has been in contact with Ammonia, remove contaminated clothing and rinse the affected skin with plenty of water for at least 15 minutes. Again, seek immediate medical attention.
- **Ingestion:** Ingesting Ammonia is unlikely in its gas form, but if this occurs, do NOT induce vomiting. Seek immediate medical attention.

The Effects of Ammonia on the Human Body

Because Ammonia is a colorless gas with an intense, pungent odor, exposure to high Ammonia concentrations may harm the eyes, throat, skin, and lungs, potentially leading to serious health risks, coma, and even death.



Upon immediate contact with moisture in the skin, eyes, mouth, respiratory tract, and especially mucus membranes, Ammonia reacts to form the highly corrosive ammonium hydroxide. This compound initiates tissue necrosis by disrupting the lipids in cell membranes, a process known as saponification, which ultimately leads to cell destruction. As the proteins in these cells decompose, water is drawn out, inciting an inflammatory response that inflicts additional harm. Symptoms include fatigue, confusion, pulmonary edema, upper respiratory irritation, tearing eyes, increased pulse rate, and increased blood pressure. The human body may absorb Ammonia exposure in a variety of different ways, including:

- **Inhalation:** Inhaling Ammonia can cause immediate nose, throat, and respiratory tract burns. This can cause bronchial and alveolar edema and airway destruction, resulting in respiratory distress or failure. Prolonged exposure to lower concentrations can also lead to respiratory complications. High levels of inhalation can lead to death.

- **Eye and Skin Contact:** Ammonia is caustic and may result in immediate burning and irritation. Ammonia gas is highly irritating to the eyes. Direct contact with the eyes can cause severe damage, including blindness. High concentrations can lead to severe burns and skin damage, including frostbite.
- **Ingestion:** If ingested, Ammonia can cause burns to the mouth, throat, and stomach. While less common, consuming Ammonia can cause mouth, throat, and stomach burns.
- **Explosion and Fire:** Ammonia can be explosive when mixed with air under certain conditions. It also reacts violently with certain chemicals, posing a risk of explosion or fire.
- **Environmental Hazards:** Large amounts of Ammonia can harm the environment. In water, it's toxic to aquatic organisms. In the air, it can contribute to acid rain.



What to Do if You're Exposed to Ammonia

While it is often used safely in several industries, including manufacturing fertilizers, plastics, and textiles, accidental exposure to its concentrated form can have profound health implications. Understanding how to respond to Ammonia exposure is essential for mitigating these risks.

Actions to Take in the Event of Ammonia Exposure

1. **Evacuate the area:** If you suspect you've been exposed to Ammonia gas, your first action should be to leave the affected area immediately, heading toward fresh air.
2. **Alert others:** Alert others nearby to evacuate and inform the relevant authorities about the incident.
3. **Avoid further exposure:** Keep away from the location until professionals have confirmed it's safe to return.
4. **Seek Medical Help**
While waiting for medical help to arrive, keep yourself or the victim calm and warm.

How is Ammonia Exposure Treated?

While there isn't a specific antidote for Ammonia poisoning, its impacts can be managed, and most people recover. Swift decontamination of the skin and eyes using ample amounts of water is crucial. The treatment primarily involves supportive strategies, which can encompass the provision of humidified oxygen, bronchodilators, and management of the airway. If Ammonia has been ingested, dilution with milk or water is typically administered.

Post-Exposure Precautions and Treatment

If you have been exposed to Ammonia gas, monitoring your symptoms closely, even after receiving initial medical care, is essential. Follow all instructions provided by healthcare professionals diligently.

- **Respiratory symptoms:** Keep monitoring your breathing. If you experience wheezing, shortness of breath, or chest tightness, seek immediate medical attention.
- **Skin and eye symptoms:** Watch out for continued irritation or any signs of infection, like redness, swelling, or discharge. Consult a doctor immediately if these symptoms persist.
- **Physical and mental health:** Exposure to hazardous gases like Ammonia can also have an impact on your mental well-being. If you notice symptoms of anxiety, panic attacks, or post-traumatic stress disorder (PTSD), seek professional psychological help.



Understanding the Industrial Accident Risks of Ammonia

Ammonia, a key component in many industrial processes, has always carried inherent risks due to its corrosive and reactive properties. However, the escalating number of Ammonia accidents over the last five years has raised questions about safety and oversight mechanisms.

Several high-profile accidents have occurred during this period, with fatalities, injuries, and significant environmental damage. These include accidents in fertilizer production plants, cold storage facilities, and chemical factories around the globe. Each instance has unique circumstances, but the common denominator is an Ammonia leak, signaling the need to focus on its handling and storage.

Potential Causes for Industrial Accidents

Multiple factors may contribute to the uptick of industrial accidents; understanding them is essential for developing appropriate responses. Key factors include:

- **Insufficient safety training:** Rapid industrial growth can lead to an influx of inexperienced workers unfamiliar with the risks of handling hazardous materials like Ammonia.
- **Inadequate equipment maintenance:** Proper maintenance of storage tanks, pipes, and other equipment involved in Ammonia handling can sometimes be overlooked or delayed due to cost considerations, leading to potential failures.
- **Lax regulatory enforcement:** In some regions, lax enforcement of safety regulations and standards has enabled practices that increase the risk of accidents.

- **Industrial expansion:** The growth in industries that heavily use Ammonia, like agriculture (fertilizers) and refrigeration, can lead to an increased risk of accidents simply due to the larger scale of operations.

Noteworthy Tragic Accidents Involving Ammonia

Industrial accidents involving Ammonia have seen a noticeable increase in the past 40 years, triggering concern among environmentalists, safety experts, and policymakers. This upsurge underscores the critical importance of revisiting safety standards, training protocols, and regulatory enforcement of this common but hazardous chemical. Notable accidents include:

- **West Fertilizer Company explosion (2013, Texas, USA):** This accident was one of the most devastating in recent history. An explosion at the West Fertilizer Company killed 15 people and injured over 160. An estimated 30 tons of stored ammonium nitrate, a derivative of Ammonia, exploded, leading to significant damage.

Insert Video: <https://www.youtube.com/watch?v=of38Ojyg8go>

Embed Code: `<iframe width="560" height="315"`

`src="https://www.youtube.com/embed/of38Ojyg8go" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture; web-share" allowfullscreen></iframe>`

- **Port of Beirut explosion (2020, Beirut, Lebanon):** In one of the largest non-nuclear explosions in history, approximately 2,750 tons of ammonium nitrate stored at the port exploded, causing at least 218 deaths, 6,000 injuries and leaving an estimated 300,000 people homeless. This accident underscored the enormous risks associated with improper storage of Ammonia-based products.

Articles:

Investigation into Beirut's massive 2020 port blast resumes:

<https://apnews.com/article/politics-beirut-lebanon-03eb5ff04f6ad86b3d0d6fb2ab25bdd6>

Documentary Video: <https://youtu.be/NgQ7jh9mrWs>

Embed Code: `<iframe width="560" height="315"`

`src="https://www.youtube.com/embed/NgQ7jh9mrWs" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture; web-share" allowfullscreen></iframe>`

- **Tianjiayi Chemical Plant explosion (2019, Jiangsu, China):** A blast at the chemical plant known to produce fertilizers caused 78 deaths and injured hundreds. While the exact cause remains unclear, reports suggest that a benzene tank exploded, igniting nearby ammonium nitrate, demonstrating Ammonia-related substances' volatile and hazardous nature.

Insert Video: https://youtu.be/8wD_NxyPsgU

Embed Code: `<iframe width="560" height="315" src="https://www.youtube.com/embed/8wD_NxyPsgU" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture; web-share" allowfullscreen></iframe>`

Safeguarding Yourself Against Ammonia Gas Exposure

As mentioned above, exposure to high concentrations of Ammonia can have harmful health implications, causing eye, nose, and throat irritation and, in severe cases, even burns. Here are some effective strategies to protect yourself and reduce your risk of exposure to Ammonia gas.

Consider Humidity and Poor Ventilation

Ammonia is lighter than air and will generally rise and dissipate. However, in conditions of high relative humidity, ammonia can form denser vapors that spread along the ground or into low-lying areas with poor ventilation, where exposure could occur.



Safe Handling at Home

You can mitigate your Ammonia exposure risk by judiciously using household products and steering clear of areas where Ammonia is employed or generated. At home, cautious handling of products containing Ammonia can significantly reduce your risk. For instance, certain cleaning agents containing Ammonia ensure that the room is sufficiently ventilated while using these products. Refrain from using Ammonia-based products stored in glass containers, as breakage could lead to severe exposure. Wearing appropriate clothing and eye protection is vital, as accidental splashes can result in skin burns or eye damage.

Never Mix Bleach with Ammonia

In a time characterized by potent pathogens and global health crises, sanitizing your home or workspace has become a significant priority.

Nonetheless, it's crucial to understand that using cleaning agents should be measured and cautious, as more doesn't always equate to better. The mixture of certain household cleaning substances can lead to life-threatening situations.

Consider the combination of bleach and Ammonia. When products that contain chlorine bleach are mixed with those containing Ammonia, chloramine gas, which is hazardous to humans and animals, is produced.

Is it possible that using bleach and Ammonia together can be lethal? Yes, indeed, the combined use of bleach and Ammonia can be fatal.

The degree of the gas produced and the duration of your exposure to it are vital factors. Inhaling chloramine gas can lead to illness, injure your respiratory tract, and, in some extreme cases, may even result in death.

In the wake of the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC) noted a 20 percent increase in calls to U.S. poison control centers due to exposure to household cleaning substances in early 2020.^{iv} However, fatalities resulting from the combination of bleach and Ammonia are quite rare.

Keeping Children Safe

Children are often more vulnerable to harmful substances due to their smaller size and natural curiosity. To safeguard them from Ammonia exposure, ensure they are out of the room when Ammonia-based products are used. It's also essential to store any Ammonia-containing products out of their reach. [Commercial gas masks are also available for children](https://www.mirasafety.com/products/cbrn-child-escape-respirator-papr) (<https://www.mirasafety.com/products/cbrn-child-escape-respirator-papr>) to minimize skin and eye contact, especially in agricultural areas.



Industrial and Agricultural Exposure

Occupational exposure is another common way people come into contact with Ammonia gas. Those working in industries like farming, refrigeration, or waste and wastewater treatment should adhere to strict safety protocols. Wear [protective clothing and gear](#) (<https://www.mirasafety.com/collections/frontpage>), such as a [gas mask](#) (<https://www.mirasafety.com/products/cm-6m-tactical-gas-mask>) to minimize skin and eye contact. Always use Ammonia according to the instructions and heed any warning statements provided by the manufacturer.



Another strategy to limit Ammonia exposure is avoiding areas where it is in active use. As Ammonia is used for crop fertilization, staying clear of these areas during application can lower your exposure. Similarly, avoiding locations where Ammonia is produced can also minimize exposure. Ammonia is prevalent in animal wastes, so it can be concentrated in the air within livestock facilities. Limiting visits to these buildings, particularly when housing large numbers of animals, can reduce your exposure.

For workers who regularly handle Ammonia, adherence to proper usage instructions and wearing appropriate clothing and safety equipment can lower the risk of exposure. It's crucial to follow all guidelines and take heed of any warning labels.

Living Near Ammonia Production Areas

Living close to areas where Ammonia is produced or used extensively, like farms or industrial zones, can also pose a risk. If possible, avoid visiting these locations when Ammonia is being applied or produced.

Preparedness and Response to Accidental Exposure

Despite the best precautions, accidental exposure may still occur. If you suspect that you've been exposed to Ammonia gas, it's important to react quickly. Seek fresh air immediately, remove any contaminated clothing, and wash your skin thoroughly with copious amounts of water. Seek immediate medical attention if symptoms persist or are severe.

Ammonia gas, while useful, can pose health risks if not handled correctly. By following the precautions outlined above, you can protect yourself and your loved ones from unnecessary exposure and ensure a safer interaction with this ubiquitous compound.

Using Personal Protective Equipment

To ensure your safety, handling Ammonia properly and using personal protective equipment (PPE), like the products provided by Mira Safety, is essential to prevent direct contact or inhalation. At Mira Safety, we believe in preparing for all eventualities. That's why we have developed an extensive range of gas masks and [CBRN \(Chemical, Biological, Radiological,](#)

[Nuclear filters](https://www.mirasafety.com/collections/frontpage) (<https://www.mirasafety.com/collections/frontpage>) to shield you from harmful substances, including Ammonia.

Our cutting-edge gas masks are designed with a user-friendly interface, allowing for easy adjustment and comfortable wear for extended periods. Engineered with superior materials, they offer high-level filtration, rendering airborne threats harmless.

Our [CBRN filters](https://www.mirasafety.com/collections/frontpage) (<https://www.mirasafety.com/collections/frontpage>) take safety one step further. Featuring state-of-the-art filtration technology, they can effectively trap and neutralize harmful substances, ensuring your breathing air remains clean and safe.

Ammonia's potential hazards are real. But with Mira Safety, you're always one step ahead. Turn potential danger into peace of mind with our innovative solutions. Trust in Mira Safety - your ultimate defense against Ammonia.

** This article is based on the most current information available. It may be updated as new information becomes available.*

Q&A

Q. How does Ammonia affect the body?

A: Ammonia is corrosive. The severity of health effects depends on the route of exposure, the dose, and the duration of exposure.

Exposure to high concentrations of Ammonia in the air causes immediate burning of the eyes, nose, throat, and respiratory tract and can result in blindness, lung damage, or death. Inhalation of lower concentrations can cause coughing and nose and throat irritation. Swallowing Ammonia can cause burns to the mouth, throat, and stomach. Skin or eye contact with concentrated Ammonia can also cause irritation and burns.^v

Q. Can Ammonia kill humans?

A: Yes. Inhaling Ammonia can cause immediate nose, throat, and respiratory tract burns. This can cause bronchial and alveolar edema and airway destruction, resulting in respiratory distress or failure. Prolonged exposure to lower concentrations can also lead to respiratory complications. High levels of inhalation can lead to death.

Q: Can Ammonia Cause Cancer?

A: At lower levels, Ammonia exposure may cause headaches, nausea, vomiting, and other symptoms. In general, humans are very sensitive to the odor of Ammonia and can detect it at concentrations well below those that would cause health effects.

However, prolonged exposure can decrease olfactory sensitivity (sense of smell), leading to a failure in detecting high concentrations of Ammonia. Chronic exposure may lead to lung disease and other health problems, but there's no concrete scientific evidence linking Ammonia exposure directly to cancer development.

Specific occupational exposures where Ammonia is a component, such as in certain industrial manufacturing or farming types, may also increase the risk of certain cancers. This risk may not be due to Ammonia itself but rather to a combination of exposures to various chemicals and environmental factors. As always, the science around these issues continues to evolve, and more current research may provide more insights.

Q: What is Ammonia Used For?

A: About 90% of the Ammonia produced worldwide is used in fertilizer to help sustain food production for billions of people worldwide^{vi}. It is also used in a myriad of applications, such as refrigerant gas, to purify water, and in the manufacture of pharmaceuticals, plastics, explosives, fabrics, pesticides, dyes, and even household cleaning supplies.

Q: What causes high Ammonia levels?

A: Ammonia, also known as NH_3 , is a waste product that bacteria in your intestines primarily make when digesting protein. Normally, Ammonia is processed in your liver, where it's transformed into another waste product called urea. The urea is then carried to your kidneys, where it's eliminated in your urine (pee).

If any part of this process, known as the urea cycle, is not working, Ammonia builds up in your blood and can pass from your blood into your brain. The level of Ammonia in your blood must remain very low. Even slightly elevated levels (hyperammonemia) are toxic to your central nervous system (CNS).^{vii}

Q: What does Ammonia smell like?

A: Ammonia (NH_3) is a colorless gas that is a compound of nitrogen and hydrogen. It has a strong odor that smells like urine or sweat. Ammonia occurs naturally in water, soil, and the air and is also found naturally in plants, animals, and the human body.

Q: Why does my sweat smell like Ammonia?

A: Protein breaks down into amino acids, which the body converts into Ammonia. The body then releases this Ammonia through urine and sweat, which may produce an odor. Dehydration can also make sweat smell like Ammonia. This is because the body needs water to eliminate Ammonia through sweat.

Q: How can I get more information about Ammonia?

A: Call the following numbers or visit the websites listed among the "Related Resources."

Centers for Disease Control and Prevention Public Response Hotline (1-888-246-2675)

- Agency for Toxic Substances and Disease Registry (1-888-422-8737)

- Regional Poison Control Center (1-800-222-1222)

Related Resources

- U.S. Food and Drug Administration:
(<http://www.accessdata.fda.gov/scripts/fcn/fcnDetailNavigation.cfm?rpt=scogsListing&id=27>)
- Agency for Toxic Substances and Disease Registry
(<https://www.atsdr.cdc.gov/toxfaqs/tfacts126.pdf>)
- American Cleaning Institute (<https://www.cleaninginstitute.org/cleaning-tips/clothes/laundry-safety-tips>)
- The Fertilizer Institute (<https://www.tfi.org/>)
- Transcaer (<https://www.transcaer.com/training/online-training-courses/anhydrous-ammonia-safety-training>)
- Agency for Toxic Substances and Disease Registry. ToxFAQs for Ammonia. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service: Atlanta, GA. <http://www.atsdr.cdc.gov/tfacts126.html>
- Agency for Toxic Substances and Disease Registry. Medical Management Guidelines (MMGs) for Ammonia. Division of Toxicology, U.S. Department of Health and Human Services. Public Health Service: Atlanta, GA. <http://www.atsdr.cdc.gov/MHMI/mmg126.html>
- Centers for Disease Control and Prevention. Public Health Emergency Preparedness and Response Sheets. U.S. Department of Health and Human Services. Public Health Service: Atlanta, GA. <http://www.bt.cdc.gov/agent/Ammonia/index.asp>
- Chemical Safety Facts.org
<https://www.chemicalsafetyfacts.org/chemicals/Ammonia/#:~:text=Ammonia%2C%20also%20known%20as%20NH,vital%20components%20of%20metabolic%20processes>
- Health.ny.gov
https://www.health.ny.gov/environmental/emergency/chemical_terrorism/Ammonia_tech.htm
- <https://www.healthline.com/health/bleach-and-ammonia>

End Notes

i

https://www.health.ny.gov/environmental/emergency/chemical_terrorism/Ammonia_tech.htm

ii

https://www.health.ny.gov/environmental/emergency/chemical_terrorism/Ammonia_tech.htm

iii

<https://www.chemicalsafetyfacts.org/chemicals/Ammonia/#:~:text=Ammonia%2C%20also%20known%20as%20NH,vital%20components%20of%20metabolic%20processes.>

iv <https://www.cdc.gov/mmwr/volumes/69/wr/mm6916e1.htm>

v

https://www.health.ny.gov/environmental/emergency/chemical_terrorism/ammonia_general.htm#:~:text=Exposure%20to%20high%20concentrations%20of,blindness%2C%20lung%20damage%20or%20death

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vi

<https://www.chemicalsafetyfacts.org/chemicals/Ammonia/#:~:text=Ammonia%2C%20also%20known%20as%20NH,vital%20components%20of%20metabolic%20processes.>

vii <https://my.clevelandclinic.org/health/articles/22686-ammonia-levels>

Meta Description Options:

1. Read this article to understand Ammonia, how it can endanger people, and how to protect against it. (100 characters)
2. Understand Ammonia, the myriad of ways it's used, possible daily exposure via household cleaning products, and how to prevent against harmful exposure. (156 characters)