Product Safety Assessment

*DOW™ Aqueous Ammonia, 20% Solution*


Select a Topic:
- Names
- Product Overview
- Manufacture of Product
- Product Description
- Product Uses
- Exposure Potential
- Health Information
- Environmental Information
- Physical Hazard Information
- Regulatory Information
- Additional Information
- References

**Names**
- DOW™ aqueous ammonia, 20% solution
- Aqueous ammonia
- Ammonia solution
- Aqua ammonia
- Ammonical liquor
- CAS No. 1336-21-6
- Ammonium hydroxide solution
- Ammonium hydroxide
- Ammonium water

**Product Overview**
- DOW™ aqueous ammonia, 20% solution, is a by-product of certain processes used to make chelating agents. It is a colorless to yellow liquid with a characteristic odor. For further details, see Product Description.
- DOW aqueous ammonia, 20% solution, is used primarily in agricultural fertilizer applications. Smaller amounts are used to scrub nitrous oxides in stack emission control systems. For further details, see Product Uses.
- DOW aqueous ammonia, 20% solution, is intended for industrial and professional use only. It is used under well-controlled, contained conditions. Workers applying this product will minimize potential exposure by carefully following application directions and wearing the proper protective equipment. For further details, see Exposure Potential.
- Eye contact may cause severe irritation with corneal injury, which may result in permanently impaired vision, chemical burns, or blindness. Brief skin contact may cause burns, irritation, local redness, or tissue damage. Even a single inhalation exposure may be hazardous. Excessive inhalation, prolonged skin contact, or ingestion of ammonia may cause severe irritation to the upper respiratory tract (nose and throat) and lungs, the gastrointestinal tract or skin. In confined or poorly ventilated areas, vapor can readily accumulate and cause unconsciousness and death. Effects may be delayed. For further details, see Health Information.
- Ammonia, the main component in DOW aqueous ammonia, 20% solution, is a part of the nitrogen cycle and is oxidized by microorganisms in the environment. Ammonia is an important source of nitrogen for living systems, and is also a by-product of metabolism in...
animals. The compound is not expected to bioconcentrate in the food chain, however it is very toxic to fish and other aquatic organisms. For further details, see Environmental Information.

- **DOW™ aqueous ammonia, 20% solution**, is stable under recommended storage and use conditions. Elevated temperatures can cause this product to decompose. Avoid contact with acids, bleach, chlorinated hydrocarbons, chlorine, halogens, oxidizers, and metals such as zinc, aluminum alloys, brass, bronze, copper alloys, silver, iron, and mercury. Contact with common metals can generate flammable hydrogen gas. Decomposition products may include ammonia. For further details, see Physical Hazard Information.

**Manufacture of Product**

- **Locations** – DOW™ aqueous ammonia, 20% solution, is produced in the United Kingdom.
- **Process** – DOW aqueous ammonia, 20% solution, is a by-product of certain processes used to make chelating agents.

**Product Description**

DOW™ aqueous ammonia, 20% solution, is a colorless to yellow solution. The concentration of ammonia in the solution is nominally 20%, but may range lower. The product typically contains 3 to 5% methanol.

**Product Uses**

DOW™ aqueous ammonia, 20% solution, is primarily used in low-cost agricultural fertilizer applications. It provides a cost-effective source of nitrogen that is essential for plant growth. It is sometimes used as a scrubber fluid in the stack emission control systems of fossil-fuel power plants to control emissions of nitrous oxides (NOx).

**Exposure Potential**

DOW™ aqueous ammonia, 20% solution, is an industrial product. Based on the uses for this product, the public could be exposed through:

- **Workplace exposure** – Exposure can occur in facilities that produce aqueous ammonia or at the industrial, commercial, or manufacturing facilities that use this material. Workplace exposure is minimized through engineering controls and the use of personal protective equipment. Each manufacturing facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit unnecessary exposure. See Health Information.
- **Consumer exposure to products containing DOW aqueous ammonia** – Dow does not market aqueous ammonia, 20% solution, for direct consumer use. See Health Information.
- **Environmental releases** – Ammonia, the main component in DOW aqueous ammonia, 20% solution will be released to the environment in some applications, such as use as agricultural fertilizer. Since the compound is oxidized by microorganisms, it is expected to be removed from water and soil environments, including sewage treatment plants. In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. Absorb small spills with inert absorbents such as sand, sawdust, or cat litter. Collect

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recovered material in properly labeled containers and dispose of it according to applicable government requirements. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. Spilled material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Respiratory and skin protection is necessary for cleaning up spills and leaks. Only properly trained and equipped personnel should attempt to isolate or contain the spill. Keep this material out of sewers. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Keep people away. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Stay upwind and out of low areas where fumes can accumulate. Use water fog or fine spray, carbon-dioxide or dry-chemical extinguishers, or foam. Water is not recommended but may be applied in large quantities as a fine spray, especially to knock down fumes. If contact is likely, firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) with an approved full-face mask with full chemical-resistant firefighting clothing. Contain fire-water run-off if possible to minimize the potential for environmental damage. Keep vapors out of sewers. Immediately withdraw all personnel from the area in case of rising sounds from venting safety devices or discolorations of the container. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

- **Unusual fire and explosion hazards** – For some products, flammable mixtures may exist within the vapor space of containers even at room temperature. Vapors are heavier than air and may travel a long distance and accumulate in low-lying areas. See Environmental, Health, and Physical Hazard Information.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

**Health Information**

Health information for DOW™ aqueous ammonia, 20% solution is summarized on the relevant Safety Data Sheets. The Safety Data Sheet is the preferred source for specific health information. This material may also contain minor components or additives that have additional health risks. An overview of health information for this product appears below.

**Eye contact** – Contact may cause severe irritation with corneal injury that may result in permanently impaired vision, chemical burns, or blindness.

**Skin contact** – Brief contact may cause skin burns, irritation, local redness, or tissue damage. Prolonged contact is unlikely to result in absorption of harmful amounts.

**Inhalation** – Vapor concentrations are attainable that could be hazardous even on a single exposure. Excessive inhalation may cause severe irritation to the upper respiratory tract (nose and throat) and lungs. In confined or poorly ventilated areas, vapor can readily accumulate and cause unconsciousness and death. Effects may be delayed.

**Ingestion** – Moderate toxicity if ingested in small amounts. Swallowing may cause irritation or burns of the mouth, throat, and gastrointestinal tract. Aspiration into the lungs may occur during ingestion or vomiting, causing lung or tissue damage.

**Repeated exposure** – Repeated exposures via inhalation, skin contact or ingestion may cause irritation at the site of contact (respiratory tract, gastrointestinal tract or skin).
Other – Aqueous ammonia is not genotoxic, carcinogenic or a reproductive/developmental toxicant.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Environmental Information\textsuperscript{10,11}
Ammonia, the main component of DOW\textsuperscript{™} aqueous ammonia, 20% solution, is volatile and may evaporate from products containing it. Because the compound is miscible in water, once introduced, it has a tendency to remain in water with little tendency to bind to soil or sediment.

Ammonia is unlikely to be persistent since it is part of the nitrogen cycle in the environment. Ammonia is an important source of nitrogen for living systems, and is also a byproduct of metabolism in animals. Since the compound is oxidized to nitrate by microorganisms, it will be removed from water and soil environments, including biological wastewater treatment plants.

Ammonia is not expected to bioconcentrate in the food chain. However, the compound is very toxic to fish and other aquatic organisms on an acute basis.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Physical Hazard Information\textsuperscript{12}
DOW\textsuperscript{™} aqueous ammonia, 20% solution, is stable under recommended storage and use conditions. However, it can decompose at elevated temperatures with rapid pressure build-up in closed systems. Store this material indoors, in a dry place out of direct sunlight in tightly closed, properly vented containers. Do not cut or weld containers. Containers should be stored and handled away from sources of ignition. Electrically bond and ground all containers and equipment before transfer or use of material.

Avoid contact with acids, bleach (sodium hypochlorite), chlorinated hydrocarbons, chlorine, halogens, oxidizers, and metals such as zinc, aluminum alloys, brass, bronze, copper alloys, silver, iron, and mercury. Contact with common metals can generate flammable hydrogen gas. During decomposition, toxic gases may be released, including ammonia.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of DOW\textsuperscript{™} aqueous ammonia, 20% solution. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet or Contact Us.

Additional Information
- Request Safety Data Sheets from the Dow Customer Information Group
- Contact Us (www.dow.com/assistance/dowcig.htm)

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Product Safety Assessment: DOW™ Aqueous Ammonia, 20% Solution


For more business information about DOW™ aqueous ammonia, 20% solution, contact the Dow Customer Information Group.

References
1 Ammonia, 20% solution, Safety Data Sheet, The Dow Chemical Company, February 10, 2010, pages 1–2 and 5.
NOTICES:

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Back to top

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