

Anhydrous Ammonia – Handling and Storage



A clear liquid under pressure, anhydrous ammonia becomes a vapor at temperatures above –28 degrees Fahrenheit at atmospheric pressure. This ability to evaporate instantly results in severe burns when Anhydrous Ammonia contacts the skin, asphyxiation if inhaled, or blindness, when it gets into the eyes. Safety devices built into anhydrous equipment, and safety factors built into storage tanks and applicators reduce the danger considerably. It is human error that accounts for almost all Anhydrous Ammonia injuries.

Obtaining accurate information and thorough training, wearing proper protective gear, and establishing the following safe handling practices will greatly reduce the chance of someone becoming injured by Anhydrous Ammonia.

North Dakota Laws pertaining to Anhydrous Ammonia
NDCC Chapter 19-20.2 Anhydrous Ammonia Facilities
NDCC 1920.3 Anhydrous Ammonia Risk Management
NDAC Article 7-12 Anhydrous Ammonia Regulation

Anhydrous Ammonia - Bulk Plant Safety

- Bulk plants should be located outside densely populated areas and the site must be kept clear of waste, weeds, or long grass.
- Ammonia plants must be properly locked when unattended.
 - Technically, a plant is locked when the main liquid and vapor valves are locked, but for everyone's protection, all hoses and valves, car riser valves, and transport stubs must be locked.
- Piers supporting Anhydrous Ammonia tanks must be structurally sound and a corrosion barrier the width of the saddle installed to prevent contact between the tank and the pier.
 - The contact area must be at least 120 degrees of the tank circumference.
- All anhydrous tanks shall be painted white, or another light, reflective color to hold down temperature and pressure.
- Treat Anhydrous Ammonia burns with water only.
 - Flush for at least 15 minutes and see a doctor as soon as possible. Never put a salve or ointment on an ammonia burn.
- Liquid valves must be painted orange, vapor valves painted yellow, or a decal or metal tag affixed within 12 inches of valve stating liquid or vapor service.
 - The valves must always be completely open or completely closed.
- Electrical equipment and wiring must be kept in good condition and protected from damage by weather.
- Vapor relief valves must direct vapor upward, away from any obstructions, and be covered with weatherproof caps.
- Only schedule 80 black pipe and fittings may be used on threaded hookups.
 - Absolutely no cast iron, galvanized, brass, or copper alloy pipe or fittings may be used for Anhydrous Ammonia.
 - Joint compounds must be ammonia resistant.

- All anhydrous hoses are stamped with its date of manufacture. Hose life is determined from date of manufacture.
 - Stainless steel reinforced, 6 years.
 - If a hose has gone beyond its useful life, or if it is damaged in any way, replace the hose immediately.

Safe Transfer of Anhydrous Ammonia

1. Every bulk plant shall have:
 - Liquid-proof gauntlet gloves;
 - Goggles or full face shields;
 - Two full face gas masks with current Anhydrous Ammonia canisters and spares;
 - 150-gallon safety water tank, filled, or a deluge shower wash down near the work area;
 - Raincoat or slicker and rubber boots;
 - Chock blocks for nurse tanks and transports;
 - First aid kit
2. Only trained personnel, preferably working in pairs, shall handle anhydrous transfers.
3. Before starting the hookup, the transport's wheels must be chocked and the brakes set.
4. After completing transfer, bleed the liquid and vapor hoses to the facility water bleed container before disconnecting them from the transport. Lift the liquid hose and drain any liquid that might have settled in the low loop of the hose.
5. An anhydrous ammonia tank is considered full when the gauge indicates the tank is at 85% capacity. Further filling increases the danger of pressure buildup from sunlight. (Gauges are only an approximate indicator for nurse tanks. The fixed liquid level gauge (bleed valve) must be used to determine actual amount.)

Nurse Tank Safety

1. No nurse tank will leave a bulk plant without the following equipment:
 - Liquid-proof gauntlet gloves;
 - Goggles;
 - Five-gallon safety water, filled;
 - Two safety chains and hitch pin assembly;
 - A "SLOW MOVING VEHICLE" emblem;
 - Marking on both sides, front, and rear of the tank in 4 inch high letters, reading "ANHYDROUS AMMONIA" and "INHALATION HAZARD";
 - "NONFLAMMABLE" gas emblems on four sides.
2. Stand upwind during filling, keeping goggles over the eyes, a respirator handy, and approved gloves on hands. Hoses must never be stretched to make connection.
3. Make sure tank wheels are chocked and the tank is disconnected from the towing vehicle.
4. Park the nurse tank at least 20 feet from all obstacles and never near a house or building.
5. Each nurse tank must have a visual inspection before leaving the bulk plant. The following items must get special attention:
 - Valves and fittings - check for leakage;
 - Hoses sound and properly secured

- Wheel lug bolts tight, tires properly inflated;
 - Securing bolts tight, welds un-cracked;
 - Safety chains correctly crossed under trailer tongue, and tongue securely hitched to towing vehicle.
 - Water container filled with clean water.
6. A nurse tank must never be filled beyond 85% of its water gallon capacity.
 7. A maximum of two nurse tanks may be pulled behind any vehicle at one time.
 8. A nurse tank must never be towed at speeds that exceed 25 MPH.

Applicator Safety

1. Wear gloves and goggles while filling and working around the applicator.
2. Make sure the emergency safety water container is filled with water.
3. Check to make sure the equipment is positioned so that the wind will not carry vapors toward homes, buildings, or growing crops.
4. Where appropriate, make sure the nurse tank is close enough to the applicator to prevent stretched hose between connections.
5. Check gaskets and fittings on the applicator before hooking up.
6. Do not overfill applicator tanks.
7. Handle hoses by the valve and hose body itself, never by the valve wheel
8. SMV (slow moving vehicle signs) for speeds less than 25 mph.
9. Inspect quick-disconnect assembly for safe operation. (Replace every three years).

Protecting Your Customer

1. Make sure the customer understands the hazards of anhydrous ammonia.
2. Urge them to use the gloves and goggles you provide and to keep a supply of water available. It is their best first aid kit in case of an emergency.
3. Post transfer and safety decal on each tank and applicator.
4. Remember: If you are not interested in safety, neither will your customers. One serious injury can jeopardize your good reputation.

Additional Resources

[OSHA Hazard Recognition– Ammonia Refrigeration](#)

[Anhydrous Ammonia: Managing the Risks](#)