

**21—43.6 (200) Standard for the storage and handling of anhydrous ammonia.** The Compressed Gas Association’s (CGA’s) American National Standard Safety Requirements for the Storage and Handling of Anhydrous Ammonia (6th edition), commonly referred to as ANSI/CGA G-2.1 2014, is adopted by this reference as the official requirement for the storage and handling of anhydrous ammonia, with the following exceptions:

1. Strike subrule 3.1 in its entirety and insert in lieu thereof the following:

3.1 Any person required to handle, transfer, transport, or otherwise work with ammonia shall be trained once each calendar year prior to handling to understand the properties of ammonia, to become competent in safe operating practices, and to take appropriate actions in the event of a leak or an emergency.

2. Insert a new subrule 5.1.3 to read as follows:

5.1.3 Equipment and components must be installed, operated, and maintained in accordance with the manufacturer’s recommendations or best engineering practices.

3. The following subrule 5.3.4 as set out in CGA G-2.1 2014, page 16, is included:

5.3.4 In the absence of a specific determination by local jurisdictions, separation distances for new, additional or relocated ammonia stationary storage containers and placements of containers covered by Sections 9, 10, 11 and 12 after January 1, 2002, shall be in accordance with Table 5:

Minimum Separation Distances for Location of Ammonia Storage Containers

Nominal Capacity of Container <sub>3)</sub> (Gallons or Cubic Meters)	Minimum Distances (in feet or meters) from Each Container to:			
	Mainline of Railroad <sub>4)</sub>	Highway <sub>5)</sub> or Line of Adjoining Property which can be built upon	Place of Public Assembly <sub>6)</sub> or Residential Occupancy <sub>7)</sub>	Institutional Occupancy <sub>8)</sub>
Over 500 to 2,000 gals <sub>9)</sub>	100 ft	25 ft	150 ft	250 ft
Over 2,000 to 30,000 gals	100 ft	50 ft	300 ft	500 ft
Over 30,000 to 100,000 gals	100 ft	50 ft	450 ft	750 ft
Over 100,000 gals	100 ft	50 ft	600 ft	1000 ft
Over 2 to 8 m <sup>3</sup>	30 m	8 m	45 m	75 m
Over 8 to 110 m <sup>3</sup>	30 m	15 m	90 m	150 m
Over 110 to 400 m <sup>3</sup>	30 m	15 m	140 m	230 m
Over 400 m <sup>3</sup>	30 m	15 m	180 m	300 m

1) Separation distances referred to are approximate and based on experience with minor releases.

2) For additional distances, see 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6 and 6.4.6.

3) The nominal capacity of multiple containers shall be aggregated, but only if containers are interconnected and safeguards do not exist to prevent a leak from one container from emptying interconnected containers.

4) Class II track or better. See 49 CFR 213.9 [8].

5) A highway is defined as a public way for purposes of vehicular travel, including the entire area within the right of way. See American Association of State Highway and Transportation Officials (AASHTO) Transportation Glossary (1983) [37].

6) Public assembly occupancy is a premise or that portion of a premise where large numbers of people congregate and from which occupants cannot quickly vacate the space. Public assembly occupancies include, among others, auditoriums, ballrooms, classrooms, passenger depots, restaurants, and theatres. See ANSI/ASHRAE 15 [1].

7) Residential occupancy is a premise or that portion of a premise that provides the occupants with complete independent living facilities including permanent provisions for living, sleeping, eating, cooking, and sanitation. Residential occupancies include, among others, dormitories, hotels, multiunit apartments, and private residences. See ANSI/ASHRAE 15 [1].

8) Institutional occupancy is a premise or that portion of a premise from which, because they are disabled, debilitated, or confined, occupants cannot readily leave without the assistance of others. Institutional occupancies include, among others, hospitals, nursing homes, asylums, and spaces containing locked cells. See ANSI/ASHRAE 15 [1].

9) For 500 gallons (2m<sup>3</sup>) or less, see 5.3.1 and 5.3.3.

4. Strike subrule 5.3.6 in its entirety and insert in lieu thereof the following:

5.3.6 Areas within 10 feet (3 meters) of a storage container shall be maintained clear of dry grass and weeds and other combustible materials. Areas shall be kept clear of debris or any item that would interfere with emergency actions or evacuation as well as materials or objects not necessary for the operation of the storage system and components.

5. Strike subrule 5.6.6 in its entirety and insert in lieu thereof the following:

5.6.6 Adequate provisions shall be made to protect the storage system and components, including all exposed piping, from physical damage which could result from impact by moving machinery, automobiles or trucks, or any other equipment at the facility. See also 6.7.1.

6. Insert a new subrule 5.10.8.2 to read as follows:

5.10.8.2 For transfer of liquids from a container utilizing a remote transfer point, each liquid filling connection shall have a positive shut-off valve in conjunction with either an internal back-pressure check valve or an internal excess flow valve. Vapor connections shall have a positive shut-off valve between the supply source and the intake side of the pump. The liquid line supplying this transfer from the pump shall have an emergency shut-off valve between the supply source and the intake side of the pump. The emergency shut-off valve shall remain closed when the plant is not in use.

NOTE: The internal back-pressure check valves or internal excess flow valves shall be installed in the facility piping prior to the positive shut-off valves. These valves shall be installed so that any break will occur on the side of the transfer hose. Protection from pull away while connected is the same as described in 5.10.8.1.

7. Add the following subrule 5.10.10:

5.10.10 Anhydrous ammonia shall be vented into an adequate supply of water. For this purpose, an adequate supply of water means ten gallons of water for each gallon of liquid ammonia or fraction thereof which is contained in the hose or vessel to be vented. The ammonia should be injected into the water as near the bottom of a vented water containing vessel as practical. If a hose is used to inject ammonia into water, the hose should be weighted or secured so that the end of the hose will remain near the bottom of the vessel. An approved sparging device is recommended. Any aqueous ammonia solution resulting from the venting process shall be disposed of safely and properly.

NOTE: Ammonia vapor may be flared off when appropriate equipment is used to not allow ammonia vapor to escape unchecked into the atmosphere. This section does not apply to venting of a coupling between transfer hose and nurse tank or applicator or venting of vapor through 85 percent bleeder valve when loading a nurse tank or applicator.

8. Add the following subrule 5.10.10.1:

5.10.10.1 Anhydrous ammonia shall not be vented into the air. Each transport truck unloading point at an anhydrous ammonia storage facility shall have a valve for venting purposes installed in the piping at or near the point where the piping and hose from the transport truck are connected. Anhydrous ammonia from any transport truck hose shall be vented into an adequate supply of water. For this purpose, an adequate supply of water means ten gallons of water for each gallon of liquid ammonia or fraction thereof

which could be contained in the hose. The ammonia should be injected into the water as near the bottom of a vented water containing vessel as practical. If a hose is used to inject ammonia into water, the hose should be weighted or secured so that the end of the hose will remain near the bottom of the vessel. An approved sparging device is recommended. Any aqueous solution resulting from the venting process shall be disposed of safely and properly.

9. Add the following subrule 5.10.11:

5.10.11 All anhydrous ammonia storage locations shall have a permanent working platform installed at each nurse tank or applicator loading location. The working platform shall be designed to allow for connecting and disconnecting of transfer hoses without standing on equipment being loaded.

NOTE: This section does not apply to nurse tanks or applicators with a working surface designed for loading purposes.

10. Add the following subrule 6.3.1.1:

6.3.1.1 Containers designed with internal pressure relief systems are exempt from this requirement.

11. Strike subrule 9.7.3 in its entirety and insert in lieu thereof the following:

9.7.3 A cargo tank of 3,500 gallons or less water capacity may be unloaded into permanent storage locations meeting the requirements of 3.4.1 and 5.10.8 through 5.10.8.2 or into implements of husbandry meeting the requirements of Section 11. A cargo tank of greater than 3,500 gallons water capacity but not greater than 5,000 gallons water capacity may be unloaded at permanent storage locations meeting the requirements of 3.4 and 5.10.8 through 5.10.8.2 or into a portable application equipment container which is capable of holding the entire load. A cargo tank of greater than 5,000 gallons water capacity may only be unloaded into a permanent storage location meeting the requirements of 3.4 and 5.10.8 through 5.10.8.2 and capable of holding the entire load.

12. Strike subrule 11.3.5 in its entirety and insert in lieu thereof the following:

11.3.5 All vapor and liquid connections, except pressure relief valves and those specifically exempt in 5.5.5 and 5.5.6, shall be equipped with approved excess flow valves or may be fitted with quick-closing internal valves, which shall remain closed except during operating periods.

1. All vapor and liquid connections shall be closed except during operation periods.

2. Shared piping where multiple containers are plumbed together shall be equipped with additional excess flow valves or back-pressure check valves or both to meet the requirements of 5.10.8.

3. Mechanical remote shut-off valves may be added or substituted for excess flow valves in the piping after the vapor and liquid connections as a means of controlling the flow.

13. Strike subrule 11.6.1 in its entirety and insert in lieu thereof the following:

11.6.1 Each person operating, repairing appurtenances of, or inspecting a nurse tank shall comply with the following requirements:

1. Any person required to handle, transfer, transport, or otherwise work with ammonia shall be trained once each calendar year prior to handling to understand the properties of ammonia, to become competent in safe operating practices, and to take appropriate actions in the event of a leak or an emergency; and

2. Any person making, breaking or testing any ammonia connection, transferring ammonia or performing maintenance or repair on an ammonia system under pressure shall wear chemical splash goggles and protective gloves impervious to ammonia. A full face shield may be worn over the goggles. However, a face shield shall not be worn as a substitute for a primary eye protection device (goggles).

14. Strike subrule 11.6.2 in its entirety and insert in lieu thereof the following:

11.6.2 Each nurse tank shall be equipped with the following safety equipment and features:

1. Each container shall have for first-aid purposes at least 5 gallons (20 liters) of clean water in a container designed to provide ready access to the water for flushing any area of the body contacted by ammonia; and
2. A legible decal listing first-aid procedures to follow for injuries caused by ammonia.

15. Strike subrule 12.3.3 in its entirety and insert in lieu thereof the following:

12.3.3 An excess flow valve is not required in the vapor connections, provided that the controlling orifice is not in excess of 0.4375 inches (11.1 mm) in diameter and the valve is a hand-operated (attached hand wheel or equivalent) shut-off valve. Bleed off of vapors may be done into water meeting requirements of 5.10.10 if vapor connections cannot be made to the supplying vessel when filling applicator tanks. Vapors may be vented into the ground in the field of application under proper field conditions.

16. Strike subrule 12.4.1 in its entirety and insert in lieu thereof the following:

12.4.1 Each person operating, repairing appurtenances of, or inspecting an applicator tank shall comply with the following requirements:

1. Any person required to handle, transfer, transport, or otherwise work with ammonia shall be trained once each calendar year prior to handling to understand the properties of ammonia, to become competent in safe operating practices, and to take appropriate actions in the event of a leak or an emergency; and
2. Any person making, breaking or testing any ammonia connection, transferring ammonia or performing maintenance or repair on an ammonia system under pressure shall wear chemical splash goggles and protective gloves impervious to ammonia. A full face shield may be worn over the goggles. However, a face shield shall not be worn as a substitute for a primary eye protection device (goggles).

This rule is intended to implement Iowa Code section 200.14.

[ARC 2059C, IAB 7/22/15, effective 1/1/16; see Delay note at end of chapter]