Section 215.200 General

a) Nitrogen fertilizer solutions are divided into subcategories as follows:

1) Aqua ammonia solution (Ammonium Hydroxide) is an aqueous solution of anhydrous ammonia generally containing from 18 to 30 percent of ammonia (NH_3) by weight and having a vapor pressure usually varying from 0 to 10 psig at 104 degrees Fahrenheit (F). Aqua ammonia may be handled in free-vented nurse and applicator tanks provided the time between filling and application into the ground is held to a minimum. Freezing point of a 25 percent aqua ammonia solution is approximately -67 degrees F. while higher percentages will have lower freezing points. Specific gravity usually ranges from .89 to about .93 depending upon temperature and concentration.

2) Low pressure nitrogen fertilizer solution is an aqueous solution of ammonia nitrate and/or urea and/or sodium nitrate and/or other nitrogen carriers, containing various quantities of free ammonia exceeding 2 percent by weight. Vapor pressure usually ranges from 0 to 30 psig at 104 degrees F. although for direct application the range is usually from 0 to less than 20 psig. These solutions shall be stored in pressure-vented tanks equipped with safety pressure relief and vacuum relief valves. Application and nurse tank equipment may be free vented for some of these solutions provided the time between filling and application is held to a minimum. Saturation temperature usually ranges from below -40 degrees F. to +65 degrees F. Specific gravity usually varies from 0.90 to 1.20.

b) In the interest of safety, personnel storing and handling nitrogen fertilizer solutions should be knowledgeable in the safe control and handling of these solutions. The Department conducts a training program in nitrogen safety procedures.

c) Ammonia vapor has a pungent odor which serves as its own warning agent. Ammonia vapor is lighter than air. Out-of-doors handling and adequate

ventilation are best means of preventing accumulation. The flammable limits to free ammonia are from 16 to 25 percent by volume in air. Experience has shown that ammonia is extremely hard to ignite in spite of these theoretical limits and is generally considered to be a non-flammable gas. Ammonium nitrate starts to decompose at temperatures above 410 degrees F. Welding should not be attempted on any system which has contained nitrogen fertilizer solutions without proper preparation (see 8 Ill. Adm. Code Section 215.Table D).

Section 215.205 Definitions

a) The terms defined in 8 Ill. Adm. Code Section 215.15 shall pertain to the rules in this Subpart. The term "nitrogen fertilizer solution" should be substituted in lieu of the term "anhydrous ammonia" where it appears in those definitions.

b) In addition to terms defined in 8 Ill. Adm. Code Section 215.15, the following terms shall apply to this Subpart:

1) "Closed system" refers to a transfer system which will return displaced vapor to the tank from which the liquid is being discharged.

2) "Filling volume" is defined as the percent ratio of the liquid in a container to the volume of the container.

3) "Free vented" as used means the system is permanently open to the atmosphere. No shutoff or check valve is allowed in such opening.

4) "Hold-down devices" refers to chains or metal straps or cables.

5) "Hold to a minimum" means the product should be loaded in anticipation of sale into the nurse tanks and delivered to the consumer for use without being stored in nurse tanks waiting for a consumer order.

6) "Nitrogen fertilizer solutions" refers to compounds (ammonium nitrate, urea, sodium nitrate, and other nitrogen carriers) formed by the combination of free ammonia and water with or without other nitrogen salts. Nitrogen fertilizer solutions includes all liquid containing more than 2% free ammonia and/or having 5 psig. It does not include material containing over 1% of phosphorous and/or potassium which is used as plant food.

7) "Pressure vented" is a system equipped with a pressure relief valve or a combination pressure-vacuum relief valve.

8) "Vacuum" refers to ounces per square inch of pressure below atmospheric pressure.

9) "Vapor pressure," unless otherwise specified, shall refer to the pressure developed by the solution at temperature specified.

Section 215.210 Application of Rules

a) These rules apply to the design, location, construction, installation and operation of distribution systems utilizing nitrogen fertilizer solutions or aqua ammonia converters.

b) 8 Ill. Adm. Code Sections 215.215 through 215.260 apply to all sections unless otherwise specified.

c) 8 Ill. Adm. Code Section 215.265 applies to storage installations for nitrogen fertilizer solutions.

d) 8 Ill. Adm. Code Section 215.270 applies to systems mounted on tank trucks, semi-trailers and trailers for transportation of nitrogen fertilizer solutions.

e) 8 Ill. Adm. Code Section 215.275 applies to systems mounted on vehicles and implements of husbandry for the transportation of nitrogen fertilizer solutions.

f) 8 Ill. Adm. Code Section 215.280 applies to systems mounted on farm vehicles for the application of nitrogen fertilizer solutions.

Section 215.215 Requirement of Construction and Original Test of Containers

a) Containers shall be constructed of a material suitable for use with nitrogen fertilizer solutions.

b) Nitrogen fertilizer solution containers shall be designed to withstand at least the maximum pressure to which they may be subjected.

c) Containers in excess of 3,000 gallons and designed for 15 psig or greater shall be constructed in accordance with The Code.

d) Pressure-vented containers not covered by The Code shall be tested by the manufacturer at one and one-half (1½) times the design working pressure.

e) Nitrogen fertilizer solution containers of 3,000-gallon capacity or less shall be clearly and permanently labeled as follows:

1) Name and location of manufacturer.

2) Design pressure (if pressure vented).

f) Nitrogen fertilizer solution containers in excess of 3,000 gallons shall be clearly and permanently labeled as follows:

1) Name and location of manufacturer.

2) Design pressure (if pressure vented).

3) Serial number.

4) Nominal water capacity in U.S. gallons.

5) Year of manufacture.

Section 215.220 Capacity of Containers

Individual container capacity shall be limited only by good engineering practice (according to The Code).

Section 215.225 Container Valves and Accessories

a) Shutoff valves and appurtenances shall be of material suitable for use with the nitrogen fertilizer solution being handled and designed for not less than the maximum pressure to which they may be subjected.

b) Except for safety pressure and vacuum relief connections and vents, connections to pressure-vented containers shall have shutoff valves located as close to the container as practicable.

Section 215.230 Piping, Tubing and Fittings

a) All piping, including tubing, fittings, gaskets, and packing, shall be made of material suitable for use with nitrogen fertilizer solutions and designed for the maximum pressure to which they may be subjected.

b) Screwed joints are permissible provided they are able to withstand maximum pressures to which they are subjected. Pipe joint compounds shall be resistant to nitrogen fertilizer solutions and compatible with materials employed.

c) Provisions shall be made in the piping system to compensate for expansion, contractions, jarring, vibration and settling.

d) After assembly, all piping and tubing shall be tested and proved to be free from leaks at a pressure not less than the normal operating pressure of the system. Test procedures shall be conducted in accordance with the Unfired Pressure Vessel Code of the American Society of Mechanical Engineers (The Code) and conducted by a person registered with the Society.

Section 215.235 Hose Specifications

a) Hose and hose connectors shall be fabricated of materials that are resistant to the action of the nitrogen fertilizer solution being used.

b) Hose and hose connectors shall be designed for at least the maximum pressure to which they may be subjected.

Section 215.240 Safety Devices

a) Every pressure-vented container shall be provided with one or more safety pressure relief valves. The rate of discharge shall be in accordance with the provisions of 8 Ill. Adm. Code Section 215.Table E.

b) Container safety pressure relief valves shall be set to start-to-discharge at a pressure not to exceed 110 percent of the design pressure of the container.

c) Safety pressure relief valves shall be arranged so the possibility of tampering will be minimized. If the pressure setting adjustment is external, the relief valves shall be provided with means for sealing the adjustment.

d) Shutoff valves shall not be installed between the safety pressure relief valves or the vacuum relief valve and the container. A safety relief valve manifold which allows one valve of two, three, four, or more to be closed and the remaining valve(s) will provide not less than the rate of discharge to allow the proper cubic feet per minute of air in relation to tank capacity as shown in 8 Ill. Adm. Code Section 215.Table A.

e) Each safety pressure relief valve and vacuum relief valve used shall be clearly and permanently marked as follows:

1) The relief setting.

2) The rate of discharge (see 8 Ill. Adm. Code Section 215.Table E).

3) The manufacturer's name and identification number.

f) Connections for venting, such as couplings, flanges, nozzles, and discharge lines, to which relief valves are attached, shall have internal dimensions at least as large in diameter as the relief valve to avoid restriction of flow through the relief valves.

g) Discharge from safety pressure relief devices of permanent storage containers shall be directed in such a manner as to prevent any impingement of escaping gas.

Section 215.245 Transfer of Liquids

a) A competent attendant shall supervise the transfer of liquids from the time the connections are first made until they are disconnected.

b) Pumps shall be of a material suitable for use with the solution being handled and designed to withstand the working pressure.

c) Air compressors may be used for transfer of nitrogen fertilizer solutions.

1) The air compressor shall be protected with a back flow check valve in the air line to prevent the flow of nitrogen fertilizer solutions or vapor from the container into the air compressor.

2) A relief valve large enough to discharge the full capacity of the compressor shall be connected to the discharge before any shutoff valve.

d) All storage installations shall be equipped with devices so as to minimize tampering while installation is unattended.

e) Containers shall be filled or used only upon authorization of owner or owner's agent.

Section 215.250 Tank Car Loading and Unloading Points and Operations

a) A sign reading, "Stop – Tank Car Connected" or "Stop – Men at Work," shall be displayed at the active end or ends of the siding while the car is connected for loading or unloading.

b) While tank cars are on siding for loading or unloading, the wheels at both ends shall be blocked on the rails.

c) Tank car loading or unloading site shall be substantially level.

Section 215.255 Liquid Level Gauging Devices

a) Gauging devices shall be arranged so that the maximum liquid level to which the container may be filled is readily determinable.

b) Gauging devices shall have a design working pressure at least equal to the design pressure of the container on which they are used.

c) Tube type liquid level gauging devices on containers in excess of 3,000 gallons shall be equipped with shutoff valves at the lower connection.

Section 215.260 Indicating Devices

Because of explosion and extreme corrosion hazard, no thermometers or other devices containing mercury shall be used where there is slightest probability of introducing mercury into nitrogen fertilizer solutions.

Section 215.265 Storage Installations for Nitrogen Fertilizer Solutions

a) Location of Storage Containers. Permanent storage shall be located outside of densely populated areas. If located within the corporate limits of a village, town or city, written approval of the municipality's governing body shall be submitted to the Department, accompanied by a plot plan, drawn to scale, prior to installing said equipment. Storage tanks installed outside of corporate limits after the effective date of these rules shall not be less than 10 feet from the lot line of the property that has been or may be built on or not less than 400 feet from any school, hospital or other existing places of public and private assembly. A copy of the county's zoning permit or municipality's approval and plot plan shall be submitted to the Department prior to site inspection. The Department will approve sites based upon compliance with this Subpart.

b) Installation of Storage Containers

1) All installation shall be permitted and shall comply with the requirements of 8 Ill. Adm. Code 255.

2) Aboveground containers shall rest on the ground or on foundations in such a manner as to permit expansion and contraction. Every container shall be supported so as to prevent the concentration of excessive loads on the supporting portion of the shell. That portion of the container in contact with the foundation or the ground shall be protected against corrosion in accordance with the Code.

3) Wherever high flood water might occur, the container shall be securely anchored or placed on a pier of a height above the normal high water mark.

c) Protection of Storage Containers and Accessories

1) Containers need not be electrically grounded. When an electrical system exists, such as for lighting or pump motors, the electrical system shall be installed and grounded as recommended by the National Electrical Code (January 1, 1982).

2) Storage container sites shall be kept free of debris and weeds.

3) Information Sign. A sign with letters of a minimum height of 2 inches shall be displayed in a conspicuous place stating the name, address and telephone number of the owner, manager or local agent of the storage location.

d) Safety Equipment. All stationary, pressure-vented storage plants shall have on hand as a minimum the following equipment:

1) A respirator.

2) One pair of rubber or plastic gloves.

3) Readily accessible shower or at least 75 gallons of clean water in an open top container.

4) Tight-fitting, vent-type chemical goggles or a full face shield.

e) Transfer of Nitrogen Fertilizer Solutions

1) In the handling and transfer of nitrogen fertilizer solutions at the storage site, a closed system or an equally effective system that will control objectionable free vapors shall be provided.

2) Transfer of nitrogen fertilizer solutions from trucks, semi-trailer or trailers in excess of 3000-gallon capacity shall be made only at sites approved by the Department (Section 215.255) or at the site of application.

f) Filling Volume. The filling volume of pressure-vented nitrogen fertilizer solution storage containers shall not exceed 95 percent.

(Source: Amended at 40 Ill. Reg. 8704, effective July 1, 2016)

Section 215.270 Systems Mounted on Trucks, Semi-trailers and Trailers for Transportation of Nitrogen Fertilizer Solutions

a) 8 Ill. Adm. Code Section 215.215 applies to this section.

b) Mounting Containers on Trucks.

1) Stops (wood or metal blocks) shall be mounted on the truck, semi-trailer, trailer, or on the container in such a way that the container shall not be dislodged from its mounting due to the vehicle coming to a sudden stop. Back slippage shall also be prevented.

2) Hold-down devices shall anchor the container to the cradle, frame, or chassis in a manner to prevent the container from rolling or bouncing off the vehicle and that will not create undue concentration of stress.

3) Any truck or trailer designed so that the container or containers constitute in whole or part the stress member of the chassis of the vehicle in lieu of a frame shall be constructed to withstand the additional stresses which are imposed. Cradles, when welded, shall be welded to the container by a welder who is registered under The Code and shall be designed to withstand a force in any direction equal to two (2) times the weight of the container when filled with nitrogen fertilizer solution.

4) If a liquid withdrawal line is installed in the bottom of a container, the connections thereto, including hose, shall not be lower than the lowest horizontal edge of the trailer axle.

5) Both ends of the hose shall be secured while in transit.

6) When the cradle and the tank are not welded together, material which will not deteriorate with weather or create a friction shall be used between them to eliminate metal-to-metal friction.

Section 215.275 Systems Mounted on Vehicles and Implements of Husbandry for the Transportation of Nitrogen Fertilizer Solutions

a) This section applies to containers of 3,000-gallon capacity or less and pertinent equipment (piping, valves and gauges attached to the container) mounted on vehicles and implements of husbandry used for the transportation of nitrogen fertilizer solutions. 8 Ill. Adm. Code Section 215.215 applies to this section.

b) Mounting Containers.

1) A hold-down device shall be provided which will anchor the container at one or more places on each side of the container to the vehicle to prevent its dislodging in event of any sudden stop or start.

2) When containers are mounted on four-wheel trailers, care shall be taken to insure that the weight is evenly distributed over both axles.

3) When the cradle and the tank are dissimilar metals, material which will not deteriorate with weather or create friction shall be used between to eliminate metal-to-metal contact.

c) Container, Valves and Accessories.

1) Each container shall be equipped with a liquid level gauging device.

2) If a liquid withdrawal line is installed in the bottom of the container, the connections thereto, including hose, shall not be lower than the lowest horizontal edge of the vehicle axle.

3) Both ends of the hose shall be secured while in transit.

d) Implements of Husbandry.

1) Implements of husbandry are defined in the Illinois Vehicle Code, Ch. 95½, Para. 1-130.

2) All trailers shall be securely attached to the vehicle drawing them supplemented by safety chains of sufficient size and strength to prevent the towed vehicle parting from the drawing vehicle in the case the drawbar should break or become disengaged.

3) A trailer shall be constructed so that it will follow in the path of the towing vehicle and will prevent the towed vehicle from slipping or swerving dangerously from side to side.

4) All nitrogen fertilizer system vehicles shall carry at least 5 gallons of clean water.

Section 215.280 Systems Mounted on Vehicles and Implements of Husbandry for the Application of Nitrogen Fertilizer Solutions

a) Working Pressure and Classifications of Containers. Containers shall be constructed in accordance with 8 Ill. Adm. Code Section 215.215.

b) Mounting of Containers.

1) Each container shall be supported so as to prevent the concentration of excessive loads on the supporting portion of the shell.

2) A hold-down device shall be provided which will anchor container to vehicle at one or more places on each side.

3) When the cradle and the tank are of dissimilar metals, material which will not deteriorate with weather or create friction shall be used between to eliminate metal-to-metal contact.

c) Container, Valves and Accessories.

1) Each container shall be equipped with a liquid level gauging device.

2) Flow control equipment may be connected directly to the tank coupling or flange, in which case a flexible connection shall be used between such control equipment and the remainder of the liquid withdrawal system. Flow control equipment not so installed may be connected to the container with a flexible connection.