WAC 296-826-50005　　Appurtenance requirements for all systems.
(1) You must make sure each appurtenance installed before February 8, 1973, is determined to be safe by meeting one of the following:

(a) Approved, tested, and installed by either:

(i) The American National Standard for the Storage and Handling of Anhydrous Ammonia (in effect at the time of installation);

(ii) The Fertilizer Institute Standards for the Storage and Handling of Agricultural Anhydrous Ammonia (in effect at the time of installation).

(b) Accepted, certified, listed, or labeled, by a nationally recognized testing laboratory.

(c) Inspected or tested by a federal, state, municipal, or local authority responsible for enforcing occupational safety provisions, when no nationally recognized laboratory will provide approval.

(d) Tested and approved by a registered professional engineer or other qualified person if the system is a custom-designed or custom-built unit and no other recognized entity will provide approval.

(2) You must keep a document on file signed by the qualified person that indicates the unit is safe. Include the test bases, test data and results and the qualifications of the qualified person.

(3) You must make sure container appurtenances are both of the following:

(a) Designed for at least the working pressure for the portion of the system where installed; and

(b) Fabricated from materials suitable for anhydrous ammonia service.

(4) You must make sure fixed liquid level gauges, except on refrigerated storage:

(a) Are designed so the maximum volume of the container filled by liquid does not exceed eighty-five percent of its water capacity; and

(b) Have a coupling into which it is threaded that is placed at the eighty-five percent level of the container.

If located elsewhere, install the dip tube of this gauge so it can not be easily removed.

(5) You must equip each container, except those filled by weight, with an approved liquid level gauging device that does all of the following:

(a) Has a design pressure equal to or greater than the design pressure of the container;

(b) Is arranged so the maximum liquid fill level of containers can be readily determined.

(6) You must follow additional requirements found in Table 5, Appurtenance Requirements for all Systems.

Table 5
Appurtenance Requirements for all Systems

If you have:	Then make sure they:
Safety relief devices	Do not have discharge termination in or beneath any building.
Safety relief valves	Have a flow capacity that is not restricted by any connection to it on either the upstream or downstream side.
Connections to containers	Have shut off valves located as close to the container as possible.

If you have:	Then make sure they:
	Exemption: Safety relief devices, gauging devices or devices fitted with a No. 54 drill size hole are not required to have shut off valves located as close to the container as possible.
Connections and the line, including valves and fittings	Have a greater rated flow than the excess flow valves that protects them.
Excess flow valves, where required	Meet all of the following: 1. Are designed with a bypass no larger than a No. 60 drill size opening to allow equalization of pressures. 2. Close automatically at the rated flow of vapor or liquid specified by the manufacturer. 3. Maintain legible markings.
Excess flow valves provided with shut off valves	Are designed to close if the shut off valve breaks during installation.
Excess flow and back pressure check valves, where required	Are located either: 1. Inside the container; or 2. Outside the container as long as the excess flow valve is: a. As close as possible to the entrance of the line; and b. Installed without excessive stress that could result in breakage between the container and the valve.
Liquid level gauging devices that: Require bleeding of the product into the atmosphere such as the rotary tube, fixed tube, and slip tube devices	Are either: 1. Designed so that the maximum opening of the bleed valve is not larger than No. 54 drill size; or 2. Provided with an excess flow valve. **Exemption:**

If you have:	Then make sure they:
	1. If openings from the containers or through fittings are attached directly onto the container where pressure gauge connections are made, then there is no need for excess flow valves as long as the openings are not larger than a No. 54 drill size.
	2. This requirement does not apply to farm vehicles used for the application of ammonia as covered by WAC 296-826-50030.

(7) You must follow Table 6, Safety Valve Start to Discharge Rate, and Table 7, Safety Relief Valve Rate of Discharge, for the following systems:

(a) Nonrefrigerated stationary containers;

(b) Mounted on trucks, semi-trailers, and trailers used for the transportation of ammonia;

(c) Mounted on farm wagons for the transportation of ammonia;

(d) Mounted on farm equipment for the application of ammonia.

EXEMPTION: The rate of discharge of spring-loaded safety relief valves installed on underground containers may be reduced to thirty percent of the rate of discharge specified in Table 6, Safety Relief Valve Rate of Discharge so long as the container is not uncovered after installation until the liquid ammonia has been removed.

Table 6
Safety Valve Start to Discharge Rate

Containers	Minimum	Maximum*
ASME U-68, U-69	110%	125%
ASME U-200, U-201	95%	100%
ASME 1952, 1956, 1959, 1962, 1965, 1968, or 1971	95%	100%
API-ASME	95%	100%
U.S. Coast Guard	(As required by U.S.C.G. regulations)	
DOT	(As required by DOT regulations)	

Note: A relief valve manufacturer's tolerance of plus ten percent is permitted.

Instructions are found below the table

Table 7
Safety Relief Valve Rate of Discharge

Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air
20	258	145	1,310	340	2,640	1,350	8,160
25	310	150	1,350	350	2,700	1,400	8,410
30	360	155	1,390	360	2,760	1,450	8,650
35	408	160	1,420	370	2,830	1,500	8,900
40	455	165	1,460	380	2,890	1,550	9,140

Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air
45	501	170	1,500	390	2,950	1,600	9,380
50	547	175	1,530	400	3,010	1,650	9,620
55	310	180	1,570	450	3,320	1,700	9,860
60	360	185	1,600	500	3,620	1,750	10,090
65	408	190	1,640	550	3,910	1,800	10,330
70	455	195	1,670	600	4,200	1,850	10,560
75	762	200	1,710	650	4,480	1,900	10,800
80	804	210	1,780	700	4,760	1,950	11,030
85	845	220	1,850	750	5,040	2,000	11,260
90	885	230	1,920	800	5,300	2,050	11,490
95	925	240	1,980	850	5,590	2,100	11,720
100	965	250	2,050	900	5,850	2,150	11,950
105	1,010	260	2,120	950	6,120	2,200	12,180
110	1,050	270	2,180	1,000	6,380	2,250	12,400
115	1,090	280	2,250	1,050	6,640	2,300	12,630
120	1,120	290	2,320	1,100	6,900	2,350	12,850
125	1,160	300	2,380	1,150	7,160	2,400	13,080
130	1,200	310	2,450	1,200	7,410	2,450	13,300
135	1,240	320	2,510	1,250	7,660	2,500	13,520
140	1,280	330	2,570	1,300	7,910		

Table instructions:
    1. The surface area = the total outside surface area of the container in square feet.
    2. When the surface area is not stamped on the name plate or the marking is not legible, calculate the area by using the Table 8, Surface Area.

Table 8
Surface Area

If you have:	Then calculate as follows:
Cylindrical container with hemispherical heads	Area = overall length in feet times the outside diameter in feet times 3.1416
Cylindrical container with other than hemispherical heads	Area = (overall length in feet plus 0.3 outside diameter in feet) times outside diameter in feet times 3.1416
Spherical container	Area = outside diameter in feet squared times 3.1416

    Flow rate: CFM air = cubic feet per minute of air required at standard conditions, 60°F and atmospheric pressure (14.7 psia).
    1. The rate of discharge may be altered for intermediate values of surface area.
    2. For containers with total outside surface area greater than 2,500 sq. ft., the required flow rate can be calculated using the formula, flow rate CFM air = $22.11\, A^{0.82}$ where A = outside surface area of the container in square feet.