

Western Plant Health Association Anhydrous Ammonia Facility / Field Tank Safety Self Inspection Safety Checklist Form

Stationary Storage Tanks

California Code of Regulations Title 8 CCR Subchapter 1 Unfired Pressure Vessel Safety Orders Article 6
Anhydrous Ammonia Sections § 501, 502, 503,504,505,506,507,508,509,510,511,512

The Western Plant Health Association has developed this Anhydrous Ammonia Portable/Mobile Storage Tank Checklist as a method to check if your anhydrous ammonia tank meets the minimum safety requirements as required under California Regulations.

Please note this checklist is only a guideline and does not contain all sections of the California Anhydrous Ammonia Regulations. We advise that you directly go to each specific regulatory section which we have attached to this checklist.

**California Code of Regulations Title 8, Subchapter 1. Unfired Pressure Vessel Safety Orders,
Article 6. Anhydrous Ammonia**

<http://www.dir.ca.gov/title8/sb1a6.html>

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Section 1: §501. Installation of Aboveground NH 3 Stationary Storage Tanks

Stationary Storage Tanks			Yes	No	NA
1.	501(a) 503(a)	All tanks over 1,200 gallons, or any portable tank installed as a permanent installation for any period of time exceeding 90 days shall considered a stationary storage tank and must conform to this section §501			
2.	501(a)	Is the stationary storage tank on concrete foundations or on full length skids limiting foundation loading of not more than 2,000 per square foot?			
3.	501(c)	Stationary storage areas are kept free from readily ignitable materials such as waste, weeds, and long dry grass?			
4.	501(c)	Is the stationary anhydrous ammonia storage tank at least 50 feet from any non residential building?			
5.	501(c)	Is the stationary anhydrous ammonia storage tank at least 400 feet away from any building used by the public, 1,000 feet for Hospitals Etc?			
6.	501(c)	Is the stationary anhydrous ammonia storage tank at least 100 feet away from any open well, reservoir or other source of portable water?			
7.	501(c)	Is all electrical systems installed are maintained in accordance with the Electrical Safety Orders?			
8.	501(d)	Where vehicle impact possible or likely is the stationary anhydrous ammonia tank protected against vehicle damage by a rugged fence, suitable crash post, curbs?			
9.	501(d)	IS the storage tank located where unauthorized tampering is possible is the anhydrous ammonia storage tank protected with a rugged steel fence or equivalent or are all liquid and vapor outlets locked when not in use?			
10.	501(e)	All anhydrous ammonia stationary storage tanks over 1,200 water capacity shall have the loading and unloading connections secured to a concrete bulkhead or equivalent that will stand a horizontal pull of not less than 2,000 lbs.?			
11.	501(f) 507(e)	Does the anhydrous ammonia stationary storage tank have a back-pressure check valve and/or excessive flow valve that are functional on each liquid and vapor line? For additional regulatory requirements on valves, piping and fittings for liquid and vapor valves see section §501and §507. www.dir.ca.gov/title8/507.html			
12.	501(h)	Are at least two full face respiratory devises in compliance with Cal OSHA's Respiratory Requirements listed in §5144, preferably one self contained breathing apparatus and one NH(3) gas mask with spare canister?			
13.	501(h)(2)	One pair of NH(3) resistant gloves?			
14.	501(h)(3)	One pair of NH(3) resistant boots?			
15.	501(h)(4)	NH(3) resistant pants and jacket and/or slicker?			
16.	501(h)(5)	One quick -acting deluge shower and bubble fountain or other method of simultaneously washing both eyes?			
17.	501(h)(6)	Does the stationary tank a minimum water supply of at least 50 gallons of water?			

Section 1: §501. Installation of Aboveground NH 3 Stationary Storage Tanks

Continued

Stationary Storage Tanks		Yes	No	NA																				
18.	^{501(h)(7)} Does the stationary tank have one first aid kit in the vicinity?																							
19.	^{501(h)(8)} Does the stationary tank have at least one fire extinguisher in the vicinity with a minimum rating of 40B-C?																							
20.	^{501(h)} Does the employer have a program/policy of periodic inspection of the emergency equipment listed in questions 12 through 19?																							
21.	<p>^{501(a)} When containing NH₃ liquid, mobile storage tanks shall be located with relation to property lines, residential buildings, highways etc.,</p> <table border="0"> <tr> <td><i>Capacity of Tank</i></td> <td><i>Line of Property</i></td> <td><i>Highway</i></td> <td><i>Residential Building</i></td> </tr> <tr> <td></td> <td></td> <td><i>Railroad</i></td> <td></td> </tr> <tr> <td>1,200-30,000</td> <td>50 feet</td> <td>50 feet</td> <td>50 feet</td> </tr> <tr> <td><i>Capacity of Tank</i></td> <td><i>Public Building</i></td> <td><i>Hospital</i></td> <td><i>Open Water</i></td> </tr> <tr> <td>1,200-30,000</td> <td>400 feet</td> <td>1,000 feet</td> <td>100 feet</td> </tr> </table> <p>Please note this is only a portion of the regulations specifying proper placement of any stationary storage tank in relations to property lines, residential buildings, highways, etc. For the complete regulatory section follow this link to: www.dir.ca.gov/Title8/501.html</p>	<i>Capacity of Tank</i>	<i>Line of Property</i>	<i>Highway</i>	<i>Residential Building</i>			<i>Railroad</i>		1,200-30,000	50 feet	50 feet	50 feet	<i>Capacity of Tank</i>	<i>Public Building</i>	<i>Hospital</i>	<i>Open Water</i>	1,200-30,000	400 feet	1,000 feet	100 feet			
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22.	^{502(a)} Does the stationary storage tank have "Caution – Ammonia" in sharp contrasting colors with letters at least 1/12 th of the tanks diameter in height, but not in excess of 1 ½ inches for tanks 500 gallons or less and 4 inches for tanks exceeding 500 gallons capacity on at least 2-sides?																							
23.	^{502(a)} Sufficient space shall be provided between stationary storage tanks to permit access for fire fighting. This space shall not be less than 5 feet between tanks over 1,200 gallons.																							
24.	^{502(a)} Tanks over 1,200 gallons the bottom side of the tank must be at least 12 inches above ground level.																							
25.	^{501(f)(1)} Is the storage tank equipped with a means of closing the liquid and vapor valves manually from a point remote from the delivery connection?																							
26.	^{501(f)(3)} Is the quick closing valve in the pipeline on the tank side of the bulkhead?																							

For the complete regulations please follow the link listed below to California Code of Regulations Title 8, Subchapter 1. Unfired Pressure Vessel Safety Orders, Article 6. Anhydrous Ammonia

<http://www.dir.ca.gov/title8/sb1a6.html>

Section 2: Piping, Valves and Fittings for Liquid and Vapor Stationary Storage Tanks

			Yes	No	NA
27.	507(a)	All pipes between the tank and the first shutoff valve shall be at least schedule 80.			
28.	507(a)	All piping must be tested after assembly and proved free of leaks at a pressure of not less than normal operating pressure or 150 psi, whichever is greater.			
29.	507I	All valves and fittings shall be of a type suitable for use with anhydrous ammonia and shall have a pressure rating of at least 400 psi WOG. Valve seat material, packing gaskets, etc., shall be suitable for anhydrous ammonia.			
30.	507(d)	Prohibited plumbing. The prohibited list is too long for this checklist. Please go directly to www.dir.ca.gov/title8/507.html for a complete list.			
31.	507(e)	Except for service valves, safety relief valves and gauging connections, all liquid and vapor connections shall have 1 of the following installed: <ul style="list-style-type: none"> • A back pressure valve. • An excessive flow valve. • A manually operated check valve (internal) • A positive check valve (Internal) 			
32.	507(e)	All excess flow valves shall be plainly and permanently marked with the rated capacity, catalog number and trade name.			
33.	507(g)	Every liquid pipeline or hose that can be isolated by 2 or more stop valves shall have a safety relief valve installed on the pipeline or hose to prevent excessive hydrostatic pressure. The hydrostatic relief valve must not discharge at less than 300 psi, nor more than 400 psi, and it must relieve to the atmosphere.			
34.	507(g)(i)	All valves, regulators, gauging and other tank accessory equipment shall be protected against damage. All operated shutoff valves must be marked whether they communicate with liquid or vapor.			

Section 3: Gauging Devices Stationary Storage Tanks

			Yes	No	NA
35.	508a	Is a permanent dip pipe installed in all tanks designed to be filled by volume?			
36.	508(a)	Is the permanent dip pipe of sufficient length that it will indicate when the tank is 86 ½ percent full?			
37.	5089b)	Is the storage tank equipped with a liquid leveling devise, such as a rotary gage, a slip tube, or an automatic gage, a magnetic gage or a series of fixed drip pipes?			
38.	508(b)(a)	Does the storage tank have a functional thermometer if it is over 1,200 gallons?			
39.	508(d)	Liquid level Gauging devises shall be designed for a working pressure of not less than 300 psi. ANSI rating.			
40.	508(c)	Liquid level Gauging devises that require bleeding of the product to the atmosphere, such as rotary gages, dip pipes or slip tubes, shall ne so designed that the maximum opening of the bleeder valve is not larger than No. 54 drill size.			
41.	508(f)	Each storage tank exceeding 1200 gallon capacity shall have a pressure gauge installed with a dial graduated to approximately double the operating pressure but in no case less than 1.2 times the pressure at which the pressure relieving devise is set to function.			

Section 4: Transfer of Liquids
Stationary Storage Tanks

			Yes	No	NA
42.	^{509(a)}	Do you prevent anhydrous ammonia be vented into the atmosphere, unless it is safe?			
43.	^{509(c)}	Are all filling connections and/or permanently installed transfer hoses equipped with a shutoff valves at the discharge end and shall be kept effectively capped when not in use?			
44.	^{509(c)}	During the transfer of anhydrous ammonia at least 1 attendant familiar with the installation shall remain in attendance at the controls.			
45.	^{509(d)}	Does the employer ensure that no anhydrous ammonia is transferred at the point of delivery within 10 feet of residential building, street, public highway, or sidewalk?			
46.	^{509(f)}	Are all the pumps and compressors equipped with pressure actuated bypass valves to prevent pressure in the transfer equipment of more than 400psi?			
47.	^{509(z)}	Do compressors have pressure gages at suction and discharge points?			
48.	^{509(g)}	Does the employer ensure the maximum filling density does not exceed either 82% or 87.5%?			
49.	⁵⁰⁹⁽ⁱ⁾	Every stationary storage tank facility shall comply with the following additional requirements. <i>1).A set of written instructions shall be posted or supplied to the operator describing in detail proper loading and unloading instructions</i>			
50.	⁵⁰⁹⁽ⁱ⁾	<i>2). A container of at least 5 gallons of fresh water. The container shall have a suitable opening to permit the application of water to flush the eyes.</i> <i>3). The point of delivery from a portable tank may be less than 50 feet but not less than 25 feet, from a highway or main railroad track.</i> <i>4). The working area shall be kept clear of debris, and all compressors, pumps, hoses, valves, etc., shall be protected from vehicle impact.</i> <i>Such equipment shall also be suitably locked or otherwise confined when unattended.</i> <i>5). The portable unloading facility must be secured at the end of each period of operation: i.e., point at which it becomes unattended.</i>			
51.	^{509(j)}	Compressors, excepting those on farm vehicles, shall be equipped with manually operated shutoff valves on both suction and discharge connections, Pressure gages of bourdon-tube type shall be installed on the suction and discharge of the compressor before the shut off valves.			
52.	^{509(k)}	All valves shall be clearly and legibly identified by metal tags or nameplates permanently affixed to each valve.			

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<http://www.dir.ca.gov/title8/sb1a6.html>

Section 5: Hose Specifications

Stationary Storage Tanks

			Yes	No	NA
53.	510(a)	Do all hoses and hose connections used in anhydrous ammonia service meet the minimum requirements and conform to TFI-RMA (The Fertilizer Institute –Rubber Manufactures Assoc). Standard #5			
54.	510(a)	Are all hoses and hose connections subjected to tank pressure shall be designed for a minimum working pressure of 350 psi, with a safety factor of at least 5.			
55.	510(a)	After new or repaired hose connections are made up, are they tested to withstand without leakage a test pressure of twice the working pressure for which the hose is designed.			
56.	510(b)	Are all hoses over ½ diameter permanently and clearly marked at intervals of not more than 5 feet with the following information; a. The words “ Anhydrous Ammonia” b. The designed working pressure c. The manufacturers name or trademark d. The year of manufacturer			
57.	510(c)	Are all anhydrous ammonia hoses and hose connections tested at least once a year to twice the tanks working pressure but not less than 500 psi.			
58.	510(c)	All low pressure hoses shall have a working pressure of 125psi or more with a safety factor of 5.			
59.		Are employees and drivers required to inspect their hoses daily?			

Section 6: Safety Relief Valves

Stationary Storage Tanks

			Yes	No	NA
60	5119a)	Does the anhydrous ammonia storage vessel have at least one safety relief valve in direct communication with the vapor space?			
61.	511(a)	Is the safety relief valve spring loaded and discharges upward from the storage tank?			
62.	511(b)	Is the safety relief valve designed to prevent the storage tank from exceeding 120 percent of the allowable working tank pressure?			
63.	511(b)	The minimum required rate of discharge of safety relief valve for anhydrous ammonia tanks shall be in accordance with the table listed in Section 511(b) www.dir.ca.gov/title/511.html			
64.	511(c)	Safety relief valves shall be so designed and installed that the possibility of tampering will be minimized. If the pressure setting is external, the relief valves shall be provided with acceptable means for sealing the adjustment.			
65.	511(d)	Shutoff valves shall not be installed between the safety relief valve and tank.			
66.	511(e)	Each safety relief valve used in anhydrous ammonia tanks shall be plainly marked with the following information: 1). With the letters "AA". 2). The pressure in pounds per square inch at which the valve is set to discharge. 3). The rate of discharge of the valve at its full open position in cubic feet per minute. 4) The manufacture’s name and catalog number. 5). The symbol of the AMSE Code.			

**Section 7: Warning Signs
Stationary Storage Tanks**

			Yes	No	NA
67.	502(a)	All anhydrous ammonia tanks over 60 gallons capacity or more shall have warning signs provided on at least two sides with: " Caution –Ammonia" in sharply contrasting colors with letters at 1½" for tanks 500 gallons or less and 4" exceeding 400 gallons.			
68.	502(b)	All NH tanks used for transportation on the highway must be as specified by the DOT.			
69.	502(c)	Un-insulated NH ₃ tanks must have a highly reflective surface and maintained in good condition.			

**Section 9: Repairs and Alterations
Above Ground Portable/Mobile Storage Tanks**

			Yes	No	NA
70.	512(a)	Field welding, where necessary, shall be made only on non-pressure parts that were installed by the manufacturer of the tank.			
71.	512(b)	No repairs or alterations involving flame, arc, or other method of welding shall be made to any tank until such tank has first been certified as free of anhydrous ammonia by competent personnel.			
72.	512(c)	No repair or alteration affecting the safety of the tank shall be made until the contemplated repair or alteration has been authorized by a qualified inspector.			
73.	512(d)	No tank that has been subjected to a fire shall be returned to service until it has been inspected by a qualified inspector and found to be safe.			
74.	512(f)	All repairs affecting the safety of the tank shall be reported to the Division within 21days by the qualified inspector authorizing such repairs. The qualified inspector shall stamp his certificate of competency number adjacent to all welded repairs authorized by him, except that in the case of repairs to quenched and tempered steels; this number need not be stamped. This exception shall be noted on the inspector's report.			
75.	512(a)	Does the employer have a policy and procedural manual on repairs in regards to both maintenance personnel and what allowable work is allowed on storage tanks?			

References:

California Code of Regulations Title 8 CCR Subchapter 1 Unfired Pressure Vessel Safety Orders Article 6 Anhydrous Ammonia Sections § 501, 502, 503,504,505,506,507,508,509,510,511,512