

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

## Portable/Mobile 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.

Section 1: General Regulations on Portable/Mobile NH <sub>3</sub> Tanks	Page	2
Section 2: Piping, Valves and Fittings for Liquid and Vapor on Portable/Mobile NH <sub>3</sub> Tanks.	Page	3
Section 3: Gauging Devises for NH <sub>3</sub> Portable/Mobile Tanks	Page	4
Section 4: Transfer of Liquids on NH <sub>3</sub> Portable/Mobile Tanks	Page	4
Section 5: Hose Specifications NH <sub>3</sub> Portable/Mobile Tanks	Page	5
Section 6: Safety Relief Valves NH <sub>3</sub> Portable/Mobile Tanks	Page	6
Section 7: Warning Signs NH <sub>3</sub> Portable/Mobile Tanks	Page	6
Section 8: Installation of NH <sub>3</sub> Tanks Mounted on Farm Machinery	Page	7
Section 9 Repairs and Alterations of NH <sub>3</sub> /Portable/Mobile Tanks	Page	8
Section 10 Installation of NH <sub>3</sub> Tanks on Transportation and Bulk Delivery Vehicles	Page	8

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

## Portable/Mobile 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

### Section 1: General Regulations

#### Above Ground Portable/Mobile Storage Tanks

**Yes No NA**

Above Ground Portable/Mobile Storage Tanks			Yes	No	NA																																
1.	503(a)	Has the portable /mobile anhydrous ammonia storage tank been in the same location for more than 90 days? If so it is considered a stationary anhydrous ammonia storage tank and you must follow regulatory guideline under Section §501																																			
2.	504(c)	Is the portable/mobile tank securely blocked against accidental movement and is it adequately supported independently of the wheels when containing NH <sub>3</sub> ?																																			
3.	505(c)	All portable tanks, the legs and/or other supporting structures shall be secured to tanks under which the tank is designed to withstand loading in any direction equal to the loaded weight of the tank when filled to the maximum permissible level with a safety factor of at least 8.																																			
4.	501(c)	Section §505(2) also requires on fixed mobile storage tanks a container of not less than 50 gallons of fresh water unless there is a immediate available another safe and reliable and accessible source of source of water.																																			
5.	504(f)	Does the portable/mobile NH <sub>3</sub> storage tank have safe and accessible source of clean water (minimum 5-gallons) immediately available to the employee?																																			
6.	501(c)	When containing NH <sub>3</sub> liquid, mobile storage tanks shall be located with relation to property lines, residential buildings, highways etc.,  <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;"><i>Capacity of Tank</i></td> <td style="text-align: left;"><i>Line of Property</i></td> <td style="text-align: left;"><i>Highway</i></td> <td style="text-align: left;"><i>Residential Building</i></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;"><i>Railroad</i></td> <td></td> </tr> <tr> <td>1,200 and less</td> <td>50 feet</td> <td>25 feet</td> <td>50 feet</td> </tr> <tr> <td>1,200-30,000</td> <td>50 feet</td> <td>50 feet</td> <td>50 feet</td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td style="text-align: left;"><i>Capacity of Tank</i></td> <td style="text-align: left;"><i>Public Building</i></td> <td style="text-align: left;"><i>Hospital</i></td> <td style="text-align: left;"><i>Open Water</i></td> </tr> <tr> <td>1,200 and less</td> <td>250 feet</td> <td>750 feet</td> <td>50 feet</td> </tr> <tr> <td>1,200-30,000</td> <td>400 feet</td> <td>1,000 feet</td> <td>100 feet</td> </tr> </table>	<i>Capacity of Tank</i>	<i>Line of Property</i>	<i>Highway</i>	<i>Residential Building</i>			<i>Railroad</i>		1,200 and less	50 feet	25 feet	50 feet	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 and less	250 feet	750 feet	50 feet	1,200-30,000	400 feet	1,000 feet	100 feet			
<i>Capacity of Tank</i>	<i>Line of Property</i>	<i>Highway</i>	<i>Residential Building</i>																																		
		<i>Railroad</i>																																			
1,200 and less	50 feet	25 feet	50 feet																																		
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 and less	250 feet	750 feet	50 feet																																		
1,200-30,000	400 feet	1,000 feet	100 feet																																		
7.	503(c)	Are all fitting on the NH <sub>3</sub> storage portable/mobile storage tank recessed in wells or otherwise protected to prevent damage to the fittings during use or transport?																																			
8	505(e)	Is all NH <sub>3</sub> liquid/vapor removed prior to moving the portable tank?																																			
9.	505(f)	Is the portable/mobile storage tank surrounded by a rugged steel fence or equivalent, or are all the liquid and vapor outlets effectively locked when unattended?																																			

## Section 1: General Regulations "Continued"

### Above Ground Stationary Portable/Mobile Storage Tanks

Yes No NA

10	503(d)	When portable tanks are transported from one location to another are they securely fastened to the transport vehicle.			
11	503(e)	When portable tanks are mounted on four-wheel trailers is care taken to insure that the weight is distributed evenly over both axles?			
12	505(d)	Only flexible connections shall be made on any mobile/portable storage tank. No permanent piping to other installations is permitted. The loading and unloading connections shall be securely fastened to the vehicle frame or to the tank support.			
13	502(a)	Does the stationary storage tank have "Caution - Ammonia" in sharp contrasting colors with letters at least 1/12 <sup>th</sup> of the tanks diameter in height, but not in excess of 1 1/2 inches for tanks 500 gallons or less and 4 inches for tanks exceeding 500 gallons capacity on at least 2-sides?			
14	503(f)	Cradle straps on portable/mobile storage tanks that are not welded must have suitable material between the straps and tank to eliminate metal to metal friction.			

## Section 2: Piping, Valves and Fittings for Liquid and Vapor

### Above Ground Portable/Mobile Storage Tanks

Yes No NA

15	507(a)	All pipes between the tank and the first shutoff valve shall be at least schedule 80.			
16	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.			
17.	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.			
18.	507(d)	Prohibited plumbing. The prohibited list is too long for this checklist. Please go directly to <a href="http://www.dir.ca.gov/title8/507.html">www.dir.ca.gov/title8/507.html</a> for a complete list.			
19.	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"> <li>• A back pressure valve.</li> <li>• An excessive flow valve.</li> <li>• A manually operated check valve (internal)</li> <li>• A positive check valve (Internal)</li> </ul>			
20.	507(e)	All excess flow valves shall be plainly and permanently marked with the rated capacity, catalog number and trade name.			
21.	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.			
22.	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

Above Ground Portable/Mobile Storage Tanks			Yes	No	NA
23.	508a	Is a permanent dip pipe installed in all tanks designed to be filled by volume?			
24.	508(a)	Is the permanent dip pipe of sufficient length that it will indicate when the tank is 86 ½ percent full?			
25.	5089b)	Is the storage tank equipped with a liquid leveling device, such as a rotary gage, a slip tube, or an automatic gage, a magnetic gage or a series of fixed drip pipes?			
26.	508(b)(a)	Does the storage tank have a functional thermometer if it is over 1,200 gallons?			
27.	508(d)	Liquid level Gauging devices shall be designed for a working pressure of not less than 300 psi. ANSI rating.			
28.	508(c)	Liquid level Gauging devices that require bleeding of the product to the atmosphere, such as rotary gages, dip pipes or slip tubes, shall be so designed that the maximum opening of the bleeder valve is not larger than No. 54 drill size.			
29.	508(f)	Each transportation tank exceeding 1200 gallon capacity shall have a pressure gage 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 device is set to function.			
30.	508(f)	Each farm vehicle tank over 250 gallons and each storage container shall be provided with a pressure gage graduated from 0 to 400 psi. Gages shall be designed for use in ammonia service.			

### Section 4: Transfer of Liquids

Above Ground Portable/Mobile Storage Tanks			Yes	No	NA
31.	509(a)	Do you prevent anhydrous ammonia be vented into the atmosphere, unless it is safe?			
32.	509©	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?			
33.	509©	During the transfer of anhydrous ammonia at least 1 attendant familiar with the installation shall remain in attendance at the controls.			
34.	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?			
35.	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?			
36.	509(2)	Do compressors have pressure gages at suction and discharge points?			
37.	509(g)	Does the employer ensure the maximum filling density does not exceed either 82% or 87.5%?			
38.	509(i)	Every portable unloading facility shall comply with the following additional requirements.  1).A set of written instructions shall be posted or supplied to the operator describing in detail proper loading and unloading instructions			

## Section 4: Transfer of Liquids "Continued"

Above Ground Portable/Mobile Storage Tanks		Yes	No	NA
39.	509(i)	<p>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.</p> <p>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.</p> <p>4). The working area shall be kept clear of debris, and all compressors, pumps, hoses, valves, etc., shall be protected from vehicle impact.</p> <p>Such equipment shall also be suitably locked or otherwise confined when unattended.</p> <p>5). The portable unloading facility must be secured at the end of each period of operation: i.e., point at which it becomes unattended.</p> <p>Definition of a portable transfer facility: Portable transferring facilities for anhydrous ammonia is defined as any site at which anhydrous ammonia is transferred from one pressure vessel to another in which the compressor and receiving vessel are not permanently installed on concrete in compliance with Section 501 Stationary Tanks.</p>		
40.	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.		
41.	509(k)	All valves shall be clearly and legibly identified by metal tags or nameplates permanently affixed to each valve.		

## Section 5: Hose Specifications

Above Ground Portable/Mobile Storage Tanks		Yes	No	NA
42.	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		
43.	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.		
44.	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.		
45.	510(b)	<p>Are all hoses over ½ diameter permanently and clearly marked at intervals of not more than 5 feet with the following information;</p> <ul style="list-style-type: none"> <li>a. The words " Anhydrous Ammonia"</li> <li>b. The designed working pressure</li> <li>c. The manufacturers name or trademark</li> <li>d. The year of manufacturer</li> </ul>		
46.	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.		
47.	510(c)	All low pressure hoses shall have a working pressure of 125psi or more with a safety factor of 5.		
48.		Are employees and drivers required to inspect their hoses daily?		

## Section 6: Safety Relief Valves

### Above Ground Portable/Mobile Storage Tanks

Yes No NA

			Yes	No	NA
49.	<sup>5119a)</sup>	Does the anhydrous ammonia storage vessel have at least one safety relief valve in direct communication with the vapor space?			
50.	<sup>511(a)</sup>	Is the safety relief valve spring loaded and discharges upward from the storage tank?			
51.	<sup>511(b)</sup>	Is the safety relief valve designed to prevent the storage tank from exceeding 120 percent of the allowable working pressure of the tank.			
52.	<sup>511(b)</sup>	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) <a href="http://www.dir.ca.gov/title/511.html">www.dir.ca.gov/title/511.html</a>			
53.	<sup>511(c)</sup>	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.			
54.	<sup>511(d)</sup>	Shutoff valves shall not be installed between the safety relief valve and tank.			
55.	<sup>511(e)</sup>	<p><i>Each safety relief valve used in anhydrous ammonia tanks shall be plainly marked with the following information:</i></p> <ol style="list-style-type: none"> <li>1). <i>With the letters "AA".</i></li> <li>2). <i>The pressure in pounds per square inch at which the valve is set to discharge.</i></li> <li>3). <i>The rate of discharge of the valve at its full open position in cubic feet per minute.</i></li> <li>4) <i>The manufacture's name and catalog number.</i></li> <li>5). <i>The symbol of the AMSE Code.</i></li> </ol>			

## Section 7: Warning Signs

### Above Ground Portable/Mobile Storage Tanks

Yes No NA

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

## Section 8: Installation of Tanks Mounted on Farm Machinery

### Above Ground Portable/Mobile Storage Tanks

			Yes	No	NA
59.	506(a)	Tanks or cylinders used to furnish anhydrous ammonia to agricultural applicator tanks and tanks used on applicators, etc., shall be so installed that the bottom of the container and/or any outlet connection, including hose, shall not be lower than the lowest horizontal edge of the vehicle axle when fully loaded. These tanks shall be secured to prevent jarring loose, slipping, or rotating of the tanks while in service. Such supports and fastenings shall be designed to withstand a loading in any direction equal to the loaded weight of the tank when filled to the maximum permissible level with a factor of safety of at least 8.			
60.	506(a)	Field welding where necessary, shall be made only on non-pressure parts that were installed by the manufacturer of the tank.			
61.	506(b)	The connections between the applicator tank and pressure-reducing valve shall be extra heavy fittings and Schedule-80 pipe, high-pressure anhydrous ammonia hose (1750 psi minimum bursting pressure), or equivalent, and where exposed, shall be protected against physical damage.  All main shutoff valves shall be readily accessible while the unit is in normal operation. All shutoff valves shall be suitably protected against physical damage.			
62.	506(c)	c) While in use on farm machinery, each skid tank, applicator tank, or combination thereof shall have securely attached a container holding not less than 5 gallons of fresh water. This container shall have a suitable opening to permit the application of water to flush the eyes.			
63.	506(d)	All trailers shall be securely attached to the vehicle drawing them by means of drawbars supplemented by suitable safety chains.			
64.	506(e)	trailer shall be constructed so that is will follow substantially in the path of the towing vehicle and will not ship or swerve dangerously from side to side.			

## Section 9: Repairs and Alterations

### Above Ground Portable/Mobile Storage Tanks

			Yes	No	NA
65.	512(a)	Field welding, where necessary, shall be made only on non-pressure parts that were installed by the manufacturer of the tank.			
66.	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.			
67.	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.			
68.	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.			
69.	512(f)	All repairs affecting the safety of the tank shall be reported to the Division within 21 days 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.			
70.	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?			

## Section 10: Installation of Tanks on Transportation and Bulk Delivery Vehicles

### Above Ground Portable/Mobile Storage Tanks

			Yes	No	NA
71.	49CFR Part 100-180 Part	All NH <sub>3</sub> tanks installed on vehicles used to transport NH <sub>3</sub> other than nurse tanks must meet the requirements of 49 CFR Part 100-180 and Carriers must also comply with 49CFR Part 300-399.			
72.	504(a)	Transportation tanks mounted on truck or trailer frames shall be placed on saddles or bolsters with the center of gravity as low as possible. Such saddles, bolsters, and/or other fastenings shall be designed to withstand a loading in any direction equal to the loaded weight of the tank when filled to the maximum permissible level with a factor of safety of at least 8.			
73.	504(a)	Transportation tanks of the so-called "frameless-type" shall not be used in anhydrous ammonia service until the design of the tank and tank supports has been submitted to the Division and found acceptable. The installation must also comply with DOT requirements.			
74.	504(a)	Transportation tanks mounted on truck or trailer frames shall be placed on saddles or bolsters with the center of gravity as low as possible. Such saddles, bolsters, and/or other fastenings shall be designed to withstand a loading in any direction equal to the loaded weight of the tank when filled to the maximum permissible level with a factor of safety of at least 8.			
75.	504(a)	Every transportation trailer or semitrailer shall have a reliable system of brakes, and adequate provision shall be made to operate the brakes from the driver's seat.			

## Section 10: Installation of Tanks on Transportation and Bulk Delivery Vehicles Continued

### Above Ground Portable/Mobile Storage Tanks

**Yes    No    NA**

			Yes	No	NA
76.	504(a)	Every transportation trailer shall be equipped with self-energizing brakes.			
77.	504(c)	All fittings on transportation tanks not protected by the vehicle frame shall be located in recessed wells or otherwise suitably guarded. Any such guards shall be designed to minimize the possibility of rupturing the tank head or shall in case of vehicular accident.  The recessed well, if used, shall be of sufficient size and depth that the top of all fittings will be located below the tank shell or head line. The recessed well for safety relief valves shall be located at the top center of the tank and shall be equipped with an unlocked hinged cover or equivalent.			
78.	504(e)	All piping and fittings on the bottom of transport and bulk delivery tanks shall be adequately guarded.			
79.	504(f)	All tank trucks and all trucks pulling tank trailers used to transport anhydrous ammonia over 1,200 gallons water capacity shall be equipped with the following minimum safety equipment which shall be properly maintained and readily available for use:  1). One pair of NH <sub>3</sub> resistant gloves. 2). Full face mask for ammonia. 3). One fire extinguisher with a rating of not less than 20B-C.			
80.	504(f)	4). A container of not less than 5 gallons of fresh water, located to permit immediate application by user is required. The fresh water container shall also have a suitable opening to permit rinsing of eyes.			
81.	504(e)	Each liquid withdrawal opening 2 inches nominal pipe size or larger on transportation tanks and bulk delivery vehicles over 1,200 gallons capacity shall be fitted with a remotely controlled internal shutoff valve. Tanks over 3,500 gallons capacity shall have 2 remote stations for the valve controls, 1 at each end of the tank and diagonally opposite each other.			
82.	504.(h)	Where excess-flow valves please section 2 Piping, Valves, and Fittings for Liquid and Vapor Lines. Section 507 (e)(2) <a href="http://www.dir.ca.gov/Title8/507.html">www.dir.ca.gov/Title8/507.html</a> .			
83.	504(i)	All liquid and vapor lines shall be adequately secured to the vehicle frame or tank. The device used to secure the lines shall be so designed that it will withstand the load imposed by the strongest hose and hose fitting to be used in the transfer operations without breaking, or 2,000 pounds, whichever is greater.			
84.	504(j)	All piping and fittings on transport and bulk delivery tanks shall be adequately guarded. The use of anhydrous ammonia hose between the tank and the transfer hose connection shall be limited to not more than 3 sections of metallic hose not over 24 inches in length in each liquid and vapor line. The manufacturer's identification required in Section 510 (b) shall be retained on each section.			