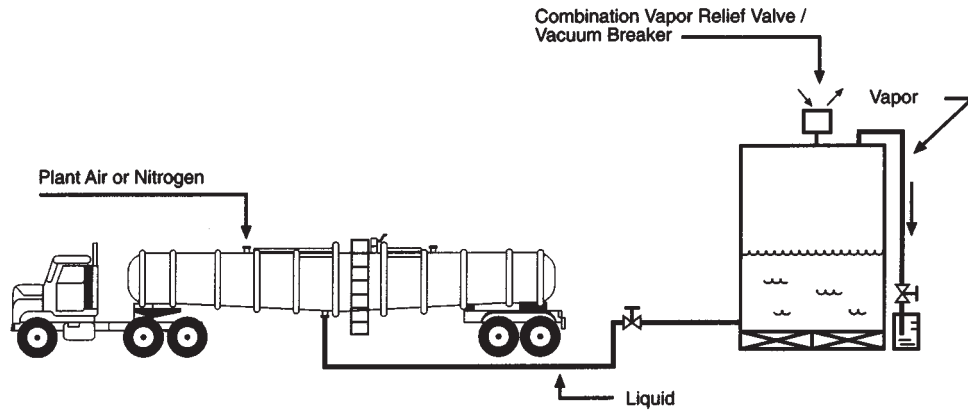


# Appendix

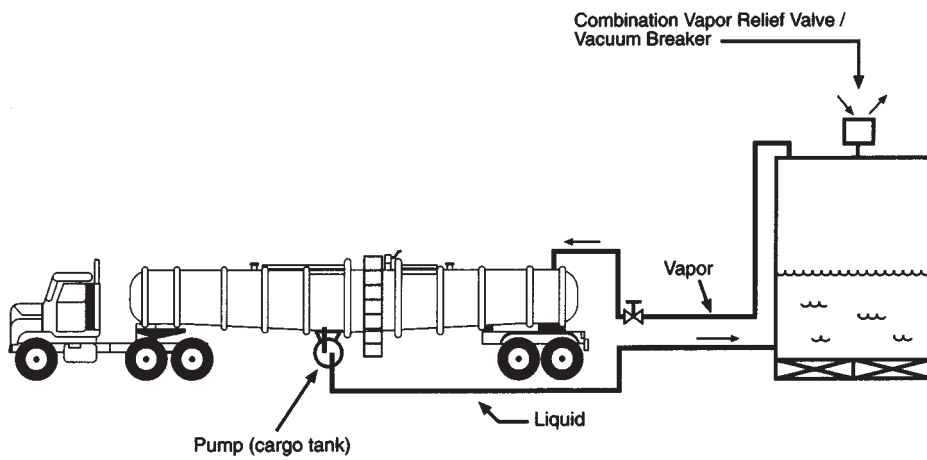
## Delivery & Storage Information



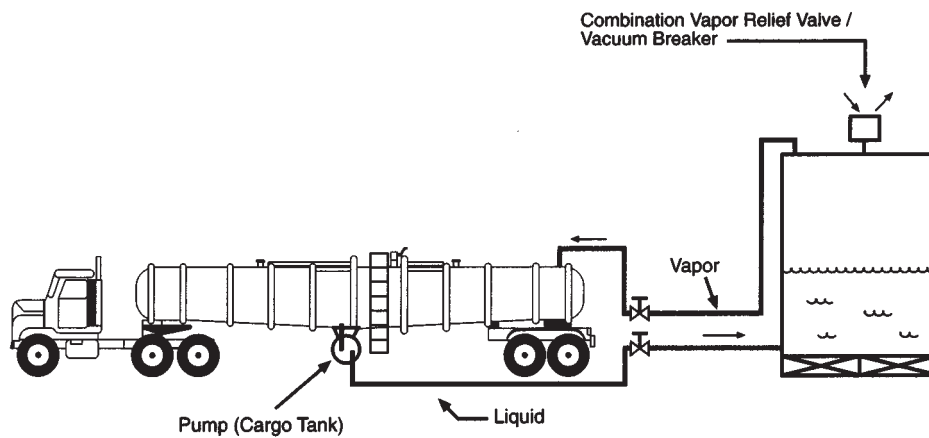
## Truck Delivery Methods



**Pressure Method**

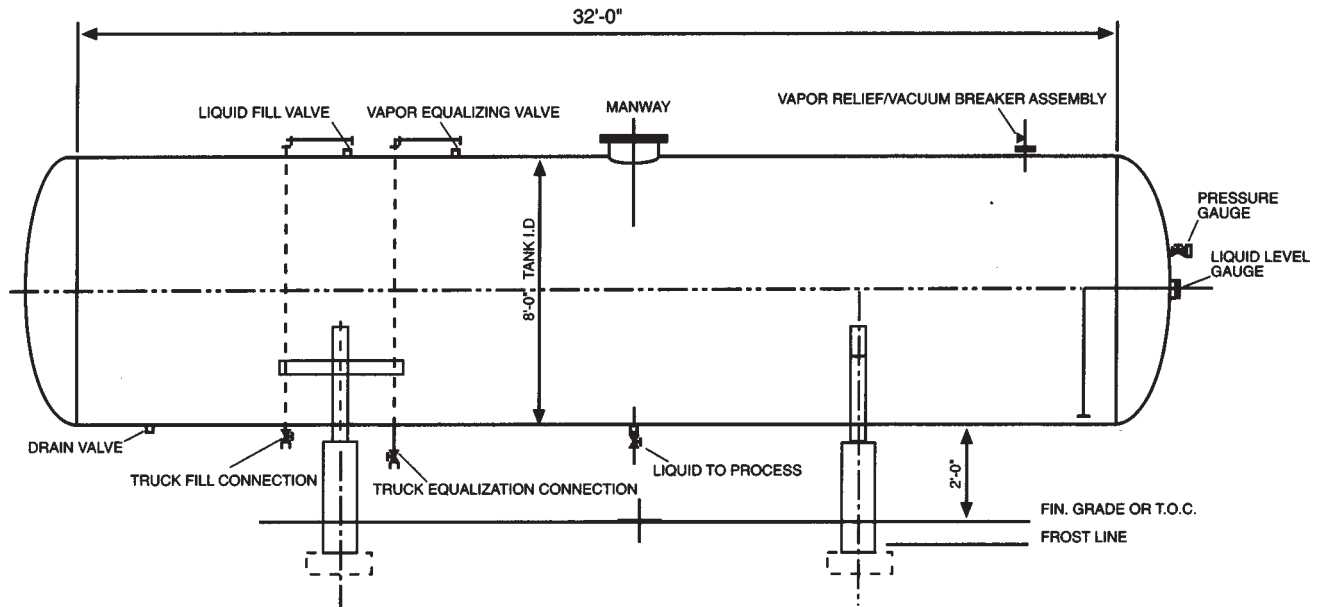


**Pump Method "A"**



**Pump Method "B"**

## TYPICAL HORIZONTAL AQUA AMMONIA STORAGE TANK



The 12,000 gallon aqua ammonia storage tank shown above can store approximately 85,000 lbs. of 26° Bé (29.4%) aqua ammonia. Although vented atmospheric pressure tanks are used by some aqua consumers, Airgas Inc. recommends the use of a minimum 25 PSIG design working pressure storage vessel built in accordance with the ASME Code for Unfired Pressure Vessels (Section VIII). The vessel can be fabricated from carbon steel, aluminum, or stainless steel.

A typical arrangement of tank openings which is suitable for most storage system requirements is shown in the drawing. See reverse side for additional information. It is possible, however, to order tanks with size dimensions and schedules of openings to meet any specific user requirement. For further information about storage systems for aqua ammonia, contact Airgas Inc.

**TB-8-8**  
**Page 1 of 2**  
**Rev. 1/90**

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## Functions of Storage Tanks Components

### Liquid Fill Line

The liquid fill line allows the transfer of product from the delivering cargo tank. It consists of a quick disconnect fitting and shutoff valve at the truck liquid fill connection point, fill line piping, and shutoff valve located on the top of the tank.

### Equalizing Line

The vapor equalizing line allows equalization of pressure to occur between the vapor space of the storage tanks and the vapor space of the delivering cargo tank. It consists of a quick disconnect fitting and shutoff valve at the truck vapor equalizing connection point, equalizing line piping, and a shutoff valve located on top of the tank.

### Vapor Pressure Relief/Vacuum Breaker Valve

A combination pressure relief valve and vacuum breaker protects the storage vessel from pressure in excess of the design working pressure and from sub-atmospheric pressures.

### Liquid Level Float Gauge

The dial on this float gauge is calibrated in percentage of total tank volume to indicate the volume of aqua ammonia in the storage tank. A metal bulb floating on the surface of the aqua ammonia actuates an indicator pointer on the dial.

### Pressure Gauge

The pressure gauge indicates the internal pressure in the storage tank. A pressure gauge calibrated from 30" vacuum to about 50 PSIG can be used if an indication of sub-atmospheric pressure is desired.

### Liquid To Process Valve

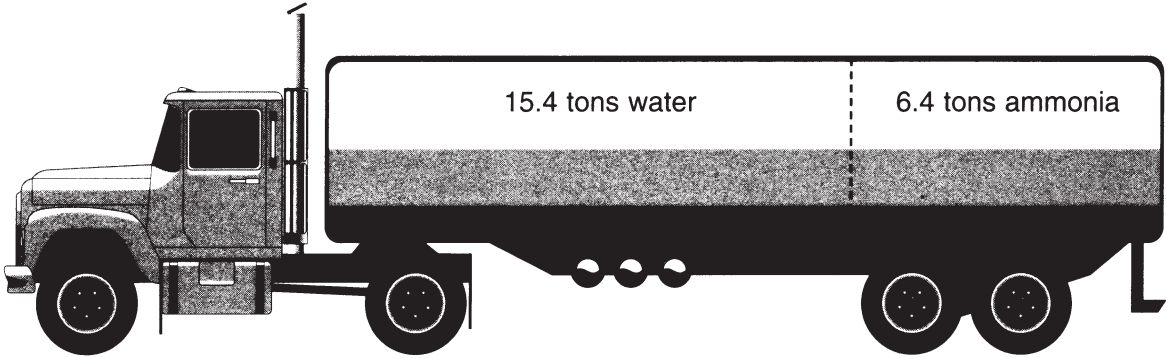
Piping from this valve is connected to the consumer's process.

### Drain Valve

This valve is used to remove product from the storage tank of the performance of some maintenance procedures or for the removal of the tank from service.

**AQUA AMMONIA TERMINOLOGY**

Confused by aqua ammonia terminology and billing procedures?  
Contained vs. solution basis? Delivered vs. FOB?  
Wet vs. dry? Pounds vs. tons vs. gallons?



This trailer holds 6.4 tons of “contained” ammonia or “dry” ammonia product. The total weight of the load is 21.8 tons. This is called the “solution” weight or “wet” weight.

Airgas Inc. bills aqua ammonia on a contained ammonia basis. Freight costs are billed on a solution basis. Suppose that your contained ammonia product cost is \$420.00 per ton and that your freight rate is \$15.00 per ton. The invoice for this truck load would be calculated as follows:

Ammonia	6.4 tons X \$420/ton = \$2,688.00
Freight	21.8 tones x 15/ton = \$327.00
	Total: \$3,015.00

Another method for billing uses a solution or “wet” basis. The solution weight for this trailer is 21.8 tons. For the cost conditions given above, the first line of the invoice would read 21.8 tons x \$123.30/ton = \$2,688.00. Both invoices would show the same total dollar amount. The solution or “wet” price per ton is much less, but remember that you are being charged for the ammonia and the water.

Delivered pricing on a contained ammonia basis is a little more complicated. In the example above, the total freight cost was \$327.00. To establish a freight rate based on contained ammonia, it is necessary to divide the freight cost (\$327.00) by 6.4 tons. This calculates to \$51.10 freight per ton of contained ammonia. Therefore, the delivered price is \$471.00 per ton (contained ammonia basis).

At a concentration of 29.4%, aqua ammonia weighs 7.5 lbs/gallon. A trailer containing 21.8 tons of aqua ammonia has a product volume equal to 21.8 tons x 2,000 lbs/ton x 1 gallon/7.5 lbs or 5,813 gallons. Degrees Baumé is a measurement system for specific gravity (density). Aqua ammonia with a specific gravity (density) of 26 ° Baumé has an ammonia weight concentration of 29.4%

**TB 5-3**  
**3/96**

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## Contents of Appendixes

Baumé / Specific Gravity / Temperature / Concentration Table for Ammonium Hydroxide . . . . .	16-17
Table of Corrections To Aqua Ammonia Sp. Gr. Readings To Compensate For Sampling Temp. Variations . . . . .	18
Table of corrections To Aqua Ammonia Baumé Readings To Compensate For Sampling Temp. Variations . . . . .	19
Aqua Ammonia Concentration Conversions . . . . .	20
Absolute Pressure of Ammonia-Water Solutions . . . . .	21
Partial Vapor Pressure of Ammonia Over Aqua Ammonia . . . . .	22
Partial Vapor Pressure of Water Over Aqua Ammonia . . . . .	23
Total Vapor Pressure (Ammonia + Water) Over Aqua Ammonia . . . . .	24
Total Vapor Pressure of Ammonia-Water Solutions . . . . .	25
Ammonia/Water Solubility At 1 Atmosphere . . . . .	26
Freezing Point of Aqua Ammonia . . . . .	27
Boiling Points of Ammonia Solutions . . . . .	28
Analytical Procedure-Ammonium Hydroxide (Aqua Ammonia) Technical Grade . . . . .	32
Analytical Procedure-Ammonium Hydroxide (Aqua Ammonia) Tech. Grade (Procedure for Sp. Gr. Test) . . . . .	32
Analytical Procedure-Ammonium Hydroxide (Aqua Ammonia) Tech. Gr. (Procedure for Assay by Titration . . . . .	33
Analytical Procedure-Ammonium Hydroxide (Aqua Ammonia) FCC . . . . .	34
Arsenic Test . . . . .	35-36
Heavy Metals Test . . . . .	37
Hazardous Materials Table (49 CFR 172.101) . . . . .	40
Non-Bulk Packagings For Liquid Hazardous Liquid And Solid Materials (49 CFR 173.203) . . . . .	41
Bulk Packagings For Certain Low Hazard Liquid And Solid Materials (49 CFR 173.241) . . . . .	42
Truck Delivery Methods . . . . .	43
Technical Bulletin #8-Typical Horizontal Aqua Ammonia Storage Tank . . . . .	44
Functions of Storage Tank Components . . . . .	45
Technical Bulletin #5-Aqua Ammonia Terminology . . . . .	46