

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
Hydropneumatic Tank Fact Sheet

Hydropneumatic Tank Definition:

Hydropneumatic tanks are vessels that hold water and air under pressure. The tanks do not have a bladder and so air is in direct contact with the water. The compressed air creates a cushion that can absorb or apply pressure as needed.



Exposed HD Tank in garage



Bulkheaded HD Tank in Wall



Vertical Galvanized HD Tank

****Bladder tanks such as the examples pictured below are not subject to the new hydropneumatic tank fiscal and asset assessment requirement.**



Hydropneumatic Tank Uses:

Hydropneumatic tanks are designed to maintain on-demand pressurized water without the continuous use of a pump and can provide storage in small water systems. By regulating system pressures, hydropneumatic tanks provide efficient water supply to quickly meet system demand.

This type of tank serves three main functions when used in water systems:

1. Delivers water within a predetermined pressure range so the well pump is not constantly running.
2. Stops a pump from starting up every time there is a slight demand for water from the distribution system.
3. Minimizes the occurrence of pressure surges, also known as water hammer.

Hydropneumatic Tank Construction and Sizing:

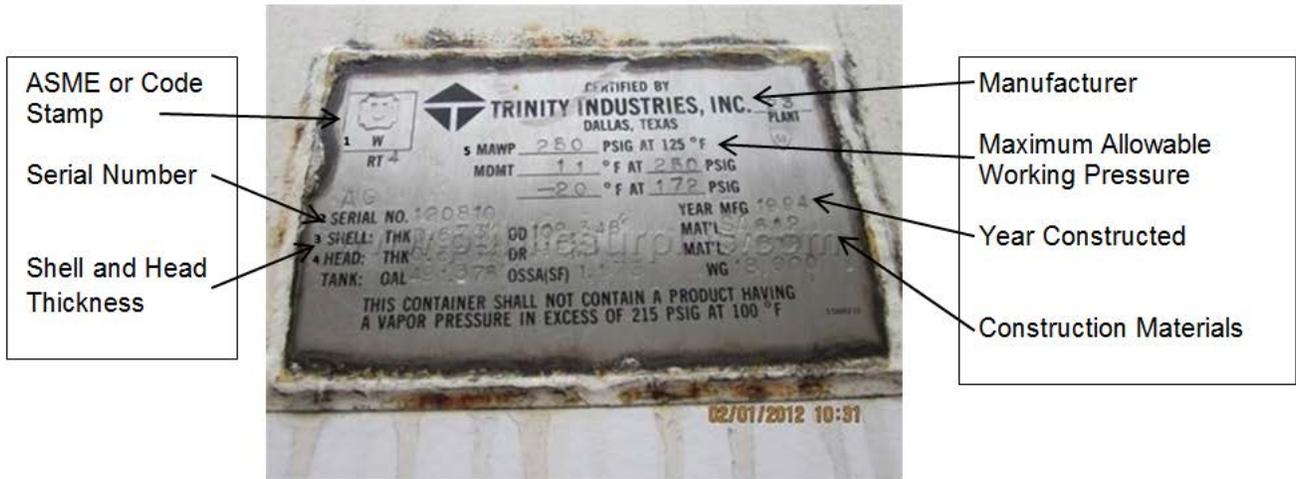
All metal vessels used as hydropneumatic, or surge, tanks must be constructed to meet American Society of Mechanical Engineers (ASME) standards. This can often be verified by reviewing the manufacturer's plate installed at the time of construction. The information on the plate should include ASME Stamp, Serial # for tank, Shell Thickness, Tank Head Thickness and Maximum Allowable Working Pressure (MAWP). Data that is found on the manufacturer's plate is critical to evaluating the structural condition and operational standards for any hydropneumatic or surge tank. The Tank Design Data may also have information such as MAWP.

If a tank does not have an ASME plate and if the tank will continue to be pressurized, it should be structurally evaluated by a professional licensed engineer who is familiar with ASME standards.



Manufacturer's
plate installed
at the time of
construction

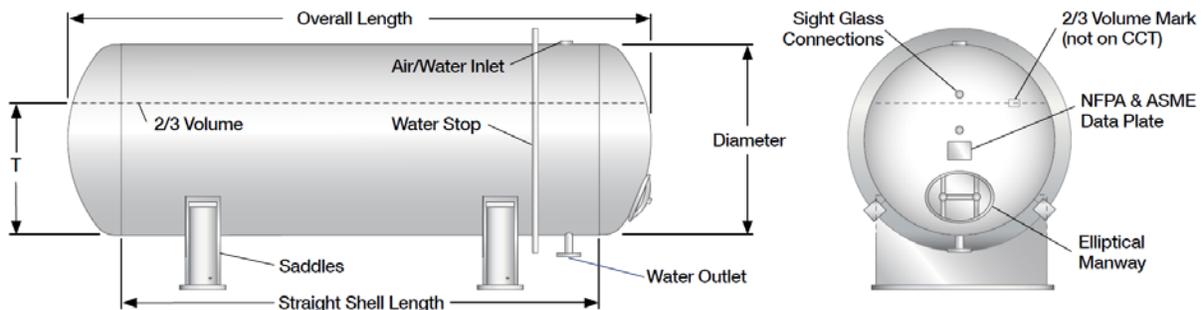
Hydropneumatic Tank Showing the Manufacturer's Plate



Manufacturer's Plate Showing the ASME or Code Stamp, the MAWP and Shell Thickness.

It is also important to make sure the proper air to water ratio is maintained in the tank when the pump is off. It is recommended that the tank is one-third air and two-thirds water. Please visit [http://www.apewater.com/wp-content/uploads/2014/01/ASME Pressure Vessels and Water Tanks-11.pdf](http://www.apewater.com/wp-content/uploads/2014/01/ASME_Pressure_Vessels_and_Water_Tanks-11.pdf) for information on Hydropneumatic Tanks including proper air to water ratio and tank sizing. Add 2 sentences on how to determine tank level/waterlogged tank?

Hydropneumatic Tank Sizing



Hydropneumatic Tank Sizing and Components - Extracted from

https://www.highlandtank.com/AdminHighlandData/ProductData/162_File.pdf

Causes of Hydropneumatic Failures

Hydropneumatic tanks require regular care and maintenance. The metal skin of pressure vessels are under constant tension. When corrosion, cracks, or a break occurs, it can rip through the metal skin at very high speeds, up to thousands of miles per hour, even under normal operating pressures. Pressure vessels are dynamic devices and so when they fail, they can fail catastrophically leading to major damage, injury, and potentially death.



Hydropneumatic Tank Failure in CT



Hydropneumatic Tank Failure in FL

Identifying Hydro-pneumatic Tank Deficiencies that could Lead to Failure

1. Tank has never been inspected internally – unknown lining condition
2. The manufacturer’s plate indicating a tank was constructed to ASME standards is not legible, and does not list the maximum operating pressure.
3. Tank is not secured to a foundation to prevent accidental movement.
4. Pressure gauges, sight levels, and hoses are not in working order and free of damage or defects.
5. The pressure relief valve (PRV) is painted, tampered with, or damaged and has not been tested or exercised regularly or replaced every 5 years.
6. Visual signs of exterior damage or corrosion exist on the visible portions of the tank.
7. Rust and corrosion visible on the lower side and welding seams of tank
8. Tank had a leak which required a welded repair.

Hydropneumatic Tank Replacement Options

If your hydro-pneumatic storage tank has outlived its useful service life, instead of spending funds on conducting an internal inspection and/or rehabilitation, your PWS may wish to move straight to replacement or removal of the aging tank. With the advancements made with variable frequency drive controllers for well and booster pumps, many PWSs are opting to create constant pressure systems eliminating the need for hydro-pneumatic tanks. If you are considering such a replacement project, it is important to ensure that any alternative water system configuration must be able to meet peak demands and separation distance requirements. Such changes and works of sanitary significance require DWS review and approval prior to construction, in accordance with RCSA Section 19-13-B102(d)(2). Projects can be submitted for review using the [General Application Form](#)

Additionally, some projects may be eligible for funding from the Drinking Water State Revolving Fund (DWSRF). DWSRF is the Section’s low interest loan program. Community public water systems and non-profit non-community public water systems are eligible to apply for and receive a loan from the Drinking Water State Revolving Fund (DWSRF) for the replacement or elimination of an existing hydro-pneumatic tank. The DWSRF offers loans terms up to 20 years on loans over

\$100,000 and shorter term loans for lower cost projects. DWSRF interest rates are approximately half of market rate but no lower than 2%. Subsidized loans may be available to small public water systems serving fewer than 10,000 persons and to larger public water systems located in distressed communities. Eligible public water systems may apply for a DWSRF loan at any time but all new applications are required to undergo a public review process and be ready to proceed in order to qualify for funding.

Within the DWSRF, a Small Loan Program is available for obtaining loans under \$100,000 with streamlined procedures for projects that eliminate hydropneumatic tanks and replace them with variable frequency drive pumping systems. The Small Loan Program projects is only available for projects that do not include the construction of new facilities, existing building alterations/additions, the use of heavy equipment for site work and where the hydropneumatic tank can be abandoned in place without removal. For more information on this loan program please visit the Drinking Water Section's [DWSRF Website](#) or contact a representative from the DWSRF Program at (860) 509-7333.

Additional Hydropneumatic Tank Inspection and Maintenance Resources:

Florida Rural Water Authority Hydropneumatic Tank Inspection and Replacement White Paper:
<http://www.frwa.net/uploads/4/2/3/5/42359811/frwawhitepaperhydropneumatictanks041608.pdf>

Association of California Water Authorities JPIA Hydropneumatic Tank Inspection and Maintenance Document:
http://www.acwajpia.com/filecabinet/rmnopw/hydropneumatic_tank_insp_9-28-12-jh.pdf