



**CHARLOTTE FIRE DEPARTMENT
FIRE MARSHAL'S OFFICE
500 DALTON AVE
CHARLOTTE, NC 28206**



High Level Water Storage Tank (HLWST)

Scope:

To determine the highest level the Charlotte Fire Department apparatus can support the fire protection system while using the current apparatus and tactics prior to installing an alternate independent stationary means of supporting the system at the higher levels of the building.

Design Method:

This is the standard to determine the method of hydraulically calculating the system to measure the highest-level fire department operations can support without the use of the HLWST;

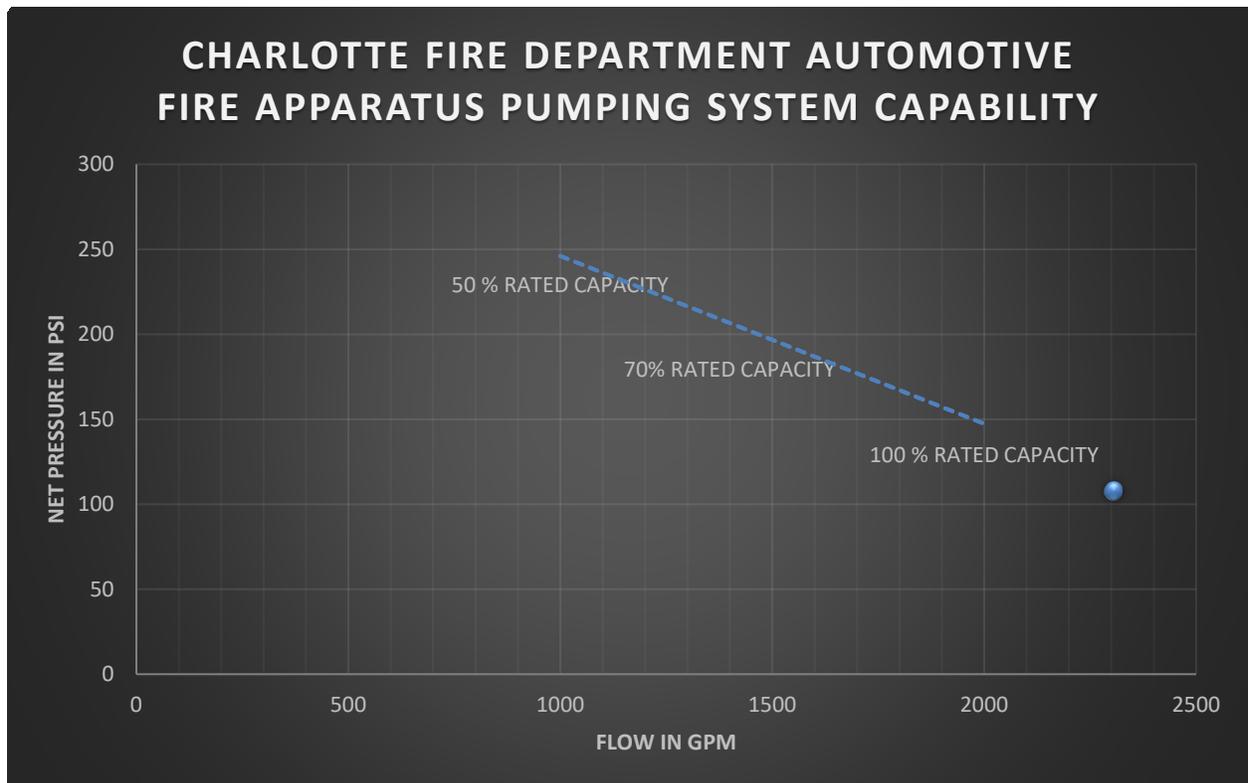


Chart above is for the Design Professional shall be used to determine the engineered analysis.



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For the apparatus's fire pump in "draft" mode:

1. A 750 gpm design at Standpipe pressure + the residual pressure (using the "low" pressure on the 48-hour test)
2. A 1000 gpm design at Standpipe pressure (250 psi) + the residual pressure (using the "Low" pressure on the 48-hour test)

If the demand exceeds the sum (not to exceed 300 psi) then a HLWST will be required.

NFPA 14 requires an automatic standpipe to be designed so that the system demand can be independently supplied by the attached water supply and each fire department connection provided on the system. Where the sum of the demand exceeds the sum (not to exceed 300 psi), then an auxiliary means of supply in the form of high-level water storage with additional pumping equipment or other means acceptable to the AHJ shall be provided.

The sizing of the stationary fire pump used for the HLWST location shall be determined by the "Design Professional" and approved by the local AHJ. Fire pump and water storage tanks for the HLWST. The total volume of all tanks or compartments shall be sufficient for the full fire protection demand.

The gauge pressure of the pump at the suction flanges shall be permitted to drop to -3 psi at 150 pct of the rated flow with the lowest water level after the maximum system demand and duration have been supplied where the supply is a suction tank with its base at or above the same elevation of the pump.

Fire pump maximum suction pressure from the first floor's fire pump shall not be greater than -3psi suction pressure to the HLWST's fire pump per NFPA 20 and 22.

Tank shall have the refill mechanisms shall comply with NFPA 20 & 22.

Standpipe demand to be independently supplied by CFD for buildings with the HLWST will be configured based upon the demand at the elevation of the highest hose valve the local responding apparatus can support, anything higher than that elevation will be supported by the HLWST and its fire pump ONLY.

Tank location shall be determined by the "Design Professional" and collaboration of their design team for any adjusting of the design to accommodate the new design.

A gravity tank can be designed and installed to meet NFPA 22 requirements.

Note:

"Design Professional" can be anyone with a seal listed in 204.3.5.1 of the NC Administrative Code. Register Architect, Professional Engineer, or a NICET III Sprinkler Designer legally registered or licensed under the laws of this state.



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A hydraulic adjustment is required to adjust the water supply curve to the lowest the lowest pressures the system encounters during a 48-hour time period. Adjustment of the water supply curve entails shifting both the static and residual pressures downward to the lowest static pressure the system encountered during the 48-hour test. The curve should show two curves in parallel shifted along the y-axis.

Water supply calculation example:
48-hour low: 70 psi static

Conditions during flow test:
80 psi static 65 psi residual 965 gpm

Adjustment:
70 psi static 55 psi residual 965 gpm