



Pumper Performance Flow Test

Strafford, New Hampshire
October 18, 2009

Overview

- On October 17th and 18th 2009, GBW Associates, LLC conducted a Rural Water Supply Operations Seminar hosted by the Strafford, New Hampshire Fire Rescue Department.
- During the seminar, one department had not drafted using dual suctions and wanted to see what type of flow they could achieve from their engine/tanker if they used dual suctions.
- A flow test was conducted using the dual suctions and the results of that test is presented here.

The Participant: Strafford Fire Rescue 25-Engine-3



25-Engine-3 is a 2008, Ahrens Fox 1,750 gpm engine/tanker with a 3,000 gallon tank. It has a 500 hp Cummins motor and a single-stage Waterous pump. The unit carries 1,200 ft of 4-inch hose, has a 10-inch rear dump/fill, and is equipped with a 3,500 gallon dump tank.

The Participant



The Process

- The engine/tanker was taken to Bow Lake and was set-up to draft on the boat ramp using dual, 6-inch suction lines.
- The engine/tanker's pre-piped deck gun was used to flow water and was equipped with a 2-inch smooth bore nozzle.
- In addition, a portable master stream device was also used to flow water. It was fed by a single, 4-inch supply line and was outfitted with a 2-inch smooth bore nozzle.
- A hand held pitot tube was used to obtain pressure readings at the discharge opening of both nozzles.
- Those pressure readings were then used in Freeman's formula to calculate the flow rate of each device which was then added together for a total flow.

The Set-up



The engine/tanker was nosed down the boat ramp as far as possible in order to minimize lift. Dual, 6-inch suction hoses were used, each 15-ft in length – and one connected to each side of the pump.

The Set-up



A TFT Crossfire portable monitor was fed by a 100-ft section of 4-inch hose. The nozzle was a 2-inch smooth bore. The master stream device was anchored to the tree for safety.

The Results



Pitot reading of 88 psi.
Flow of 1,114 gpm



Pitot reading of 140 psi.
Flow of 1,406 gpm

Total Flow = 2,520 gpm – pretty impressive

Summary

- It was clear that using dual suctions and a lift of about 5-ft could produce a flow capability of about 2,500 gpm.
- This shows the importance of carrying enough equipment to maximize the capability of a pump when drafting.
- In this case, this 1,750 gpm pump has plenty of ability to get rid of water; one just has to get the water into the pump.
- One important note, the 140 psi on the deck gun was a bit high, but it occurred before we could get the throttle cut back some. It was snowing and folks were wet and tired, so we just did a quick test and this pressure surge was a result. Most likely, the 140 psi was approaching (or at) the point where too much pressure was on the deck gun. If we were to replicate the test again, more caution would be used in raising discharge pressure to the deck gun.



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