



## WATER SUPPLY TECHNICAL ADVISORY COMMITTEE

### OHIO FIRE CHIEFS' ASSOCIATION

*Dedicated to finding innovative solutions and best practices to support the water supply needs of the Ohio Fire Service*

## Low-Level Strainer Testing 6/15/19 – Lockington, OH

PREMIER • PROFESSIONAL • PROACTIVE

### Take-away lessons from this testing:

- Compared to the available literature found online, these strainers did not necessarily perform “as advertised”. Flow rate suction losses and attainable minimum water levels listed differed from our test data.
- All six low-level strainers tested were capable<sup>1</sup> of drawing water at 500gpm to the 3 or 4” level in the dump tank. At their max capacity, all strainers were capable<sup>1</sup> of drawing water to the 4 to 6” level in the tank.
- Many considerations should go into the decision about which strainer to use. Prices among those tested varied widely, weight and size were also variable. These attributes have to be taken in context with the goal in mind.
- A strainer that creates excessive restriction will inhibit our ability to achieve desired flow rates; especially when utilizing a remote suction connection or drafting through a valve. Replacing a restrictive low-level strainer with one that has better flow characteristics may drastically improve performance.
- In this testing, we connected to the best possible point on the apparatus and removed all flow restricting devices between the pump impeller and the strainer. This best-case scenario is rare to achieve in the real world, tested peak flow rates may not reflect what your apparatus and equipment are able to achieve.
- The Ohio Fire Chiefs’ Water Supply TAC looks forward to continued testing of low-level strainers and other water supply devices to broaden the knowledge of fire apparatus operators everywhere.

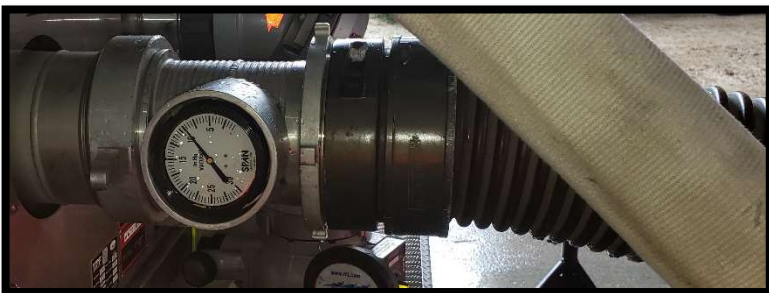
<sup>1</sup> See notes on the Action strainer in reference to performance at water level testing.

### Test Procedures:

The test setup included a 2,500 gallon dump tank with the water level maintained by Fort Loramie Community Fire Company’s Pumper-Tanker 361, a Toyne/Spartan with a mid-mount 1,750gpm Hale pump supplied by direct suction to the river. 361 powered two TurboDraft eductors that directly delivered water from the Great Miami River to the dump tank on the roadway. Lockington Volunteer Fire Department’s Engine 763, another Toyne/Spartan with a rear-mount 1,500 gpm Waterous, was the test engine.



To eliminate the unknown restriction in pump intake plumbing, vacuum readings were taken at a custom test port placed between the pump intake threads and the suction hose. The test pump has no internal suction valves and the external valve was removed for testing. The test pump passed an NFPA dry prime test with 0 inHg loss in 5 minutes. The suction hose used was 10’ of Firequip brand 6” PVC suction hose with 6” NST fittings. Each strainer was connected directly to the male threads of this hose for testing. The pressure loss value for this hose was taken from NFPA 1142, 2017 edition, table I.1(h) *Pressure Loss in Suction Hose*. The pressure loss associated with elevation was also accounted for by subtracting the average depth of water in the dump tank during each test (18-27”) from the height of the pump’s centerline above the roadway (43”).



Air and water temperature for all testing remained in the mid-60’s degree Fahrenheit range. Elevation was approximately 900 feet ASL. For each flow rate on each strainer tested, pump discharge pressure was maintained at 150psi. Once the throttle and valves were set and readings had stabilized, readings were taken at zero, one minute, and two minutes.



### TFT Low-Level Strainer 6" Female w/ Jet Siphon & Float

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **0.5" / 0.2psi** @500gpm, water level reached 3" at loss of prime  
 750 - **2.9" / 1.4psi** @1,500gpm, water level reached 5" at loss of prime  
 1,000 - **4.1" / 2.0psi**  
 1,250 - **6.3" / 3.1psi** Weight w/float-29lbs w/o float-23.5lbs  
 1,500 - **6.5" / 3.2psi** Ht-12.5" Length-21" Width-w/float 15" w/o float 14"

\*The float defaults to "flipped back" as the water level drops, minimum levels were taken with the float back.



### Action Power-Flow 6" Low Level Strainer

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **0.7" / 0.3psi** @500gpm, water level reached 4" / 9"\* at loss of prime  
 750 - **2.2" / 1.1psi** @1,500gpm, water level reached 5" / 10"\* at loss of prime  
 1,000 - **4.8" / 2.3psi**  
 1,250 - **7.8" / 3.8psi** Weight 29lbs  
 1,500 - **7.9" / 3.9psi** Ht-12.5-15"(handle) Length-14.5-16.5"(handle) Width-14"

\*This strainer has no swivel from the hose to the tank floor and had to be physically held down by a firefighter.



### Fol-Da-Tank Aluminum Low-Flow 6" Strainer w/ Jet Booster

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **1.1" / 0.6psi** @500gpm, water level reached 4" at loss of prime  
 750 - **4.5" / 2.2psi** @1,250gpm, water level reached 6" at loss of prime  
 1,000 - **7.4" / 3.6psi**  
 1,250 - **11.8" / 5.8psi** Weight-21lbs  
 1,500 – Failed to achieve Ht-12-14"(inlet handles) Length-15.5" Width-13"



### Kochek Big Water 6" Low Level Strainer w/ Jet Siphon

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **2.3" / 1.1psi** @500gpm, water level reached 3" at loss of prime  
 750 - **5.0" / 2.4psi** @1,000gpm, water level reached 4" at loss of prime  
 1,000 - **9.4" / 4.6psi**  
 1,250 – Failed to achieve\* Weight-13.5lbs  
 1,500 – Failed to achieve Ht-13-17.5"(inlet handles) Length-17-19"(angle head) Width-16"

\*Actually hit 1,250gpm in testing, but the flow would not maintain long enough for data collection.



### Kochek Standard 6" Low Level Strainer w/ Jet Siphon

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **3.2" / 1.6psi** @500gpm, water level reached 3" at loss of prime  
 750 - **7.8" / 3.8psi** @1,000gpm, water level reached 5" at loss of prime  
 1,000 – **14.8" / 7.3psi**  
 1,250 – Failed to achieve Weight-12lbs  
 1,500 – Failed to achieve Ht-12.5-15"(inlet handles) Length-15.5-16"(angle head) Width-15.5"



### Red Head Model 137 Low Level Strainer – 6"

Flow(gpm) – Strainer Loss (inHg) / (psi)

500 - **4.2" / 2.1psi** @500gpm, water level reached 3" at loss of prime  
 750 - **10.8" / 5.3psi** @750gpm, water level reached 3" at loss of prime  
 1,000 – Failed to achieve  
 1,250 – Failed to achieve Weight-27lbs  
 1,500 – Failed to achieve Ht-10.5-14"(swivel & inlet handles) Length-17-19"(angle head) Width-11.5-13.5"

\*Unable to find this strainer for sale new, the manufacturer has a new design under model 137-HV.