

Box Strainer Flow Test Results Briefing

September 30, 2017

On September 30, 2017, the folks from GBW Associates, LLC and Water Supply Innovations, LLC conducted a number of flow tests on 30 different makes, models, and styles of 6-inch, fire department suction strainers. The results from the box strainer performance tests are presented in this document.

All testing was done at the Hunterdon County Emergency Services Training Center in Annandale, New Jersey. Engine 1262 from the Glen Gardner Fire Company was used for each flow test. The pumper was equipped with a Hale QMax 2,250 gpm single-stage pump powered by a 515 hp diesel motor.

The Test Conditions

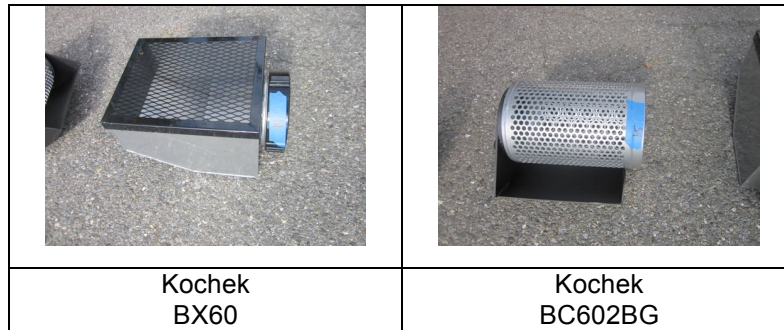
All test conditions were kept constant from flow test to flow test:

- 20-feet of 6-inch Kocheck lightweight suction hose;
- 3.52-feet of lift;
- 371-feet test site elevation;
- Air temperature between 60 °F and 69 °F;
- Water temperature between 60 °F and 70 °F;
- 50-feet of 4-inch hose from the pump's high-flow discharge supplying a 2-1/2-inch Hose Monster; and,
- Dual, 3-inch hoses, each 50-feet in length, each connected to a 2-1/2-inch discharge, and each supplying a portable monitor outfitted with an Akron Flow Test Kit and 1-3/4-inch smooth bore tip.
- All strainers tested, except the floating strainers and the ice strainer, were tested at a depth of 25-inches below the water's surface.
- The same person operated the fire pump.
- The same person oversaw pump operations and suction strainer deployment.
- The same person collected all physical data on each suction strainer.
- The same person recorded all gauge readings.

The only variable in the entire flow testing process was the suction strainer being tested.

Prior to the first suction strainer flow test, a flow test was completed using no strainer on the suction hose. This test provided a baseline for comparison of all strainers: as strainers were added to the end of the suction hose, a restriction in flow was expected. For each flow test, data was recorded at peak output flow, which in most cases was also the point at which pump cavitation began.

The Box Strainers



Box Strainer Flow Test Results

Device	Flow Achieved (gpm)	Motor Speed (rpm)	Vacuum Reading ("Hg)
No strainer (Baseline Test)*	1800 gpm	1225 rpm	17.0 in
Kochek Box (BX60)	1830 gpm	1200 rpm	15.5 in
Kochek Bottom Guard (BS602BG)	1864 gpm	1200 rpm	15.0 in

General Notes About the Flow Tests

- The baseline flow test measured maximum flow without the use of a suction strainer.
- All flow readings were obtained using remote test gauges connected to a 2-1/2" HoseMonster flow diffuser and to an Akron Flow Test Kit on a portable deluge gun outfitted with a 1-3/4-inch smooth bore nozzle.
- Motor speed readings were obtained using the digital tachometer on the pumper's pump panel.
- Vacuum readings were obtained using a remote test gauge connected to the pump's vacuum test port.
- All test gauges were either new or recently calibrated. All test gauges were also field verified the morning of the flow tests. Therefore, all flow readings are expected to have a 5% or less margin of error.

The Findings

Only one, actual box strainer was available for testing, so a Kochek Big Water Bottom Guard Barrel Strainer was added to the project since that strainer is designed to operate similar to a box strainer. In reality, both the Fol-Da-Tank and Ziamatic floating suction strainers can also function as box strainers if the floats are removed – thus showing their versatility.

Regarding the flow tests on the two Kochek products, both performed very well and at relatively consistent vacuum readings. There was little performance difference between the box strainer and bottom guard barrel strainer.

Many thanks to all of the folks and fire departments that contributed time, equipment, and funds in support of this project. A complete listing can be found in the project's "official" white paper.

Questions or concerns about the flow test results can be directed to Mark E. Davis, CFPS at www.gotbigwater.com by emailing thebigcamel@gotbigwater.com or by joining the Members Area of www.GotBigWater.com.