



# Air Primer Drafting Test: 100-feet of Suction Hose

Winfield, Maryland  
July 31, 2012

# Overview

- In late July 2012, the Winfield Community VFD located in Carroll County, Maryland, was the first fire department in the United States to have the new, Trident Automatic Air Primer installed on one of its pumpers.
- Winfield's Engine 142 is a 2007 4-Guys pumper built on a Spartan chassis and equipped with a Hale Q-Max 1,500 gpm pump. The Hale pump was equipped with a Hale Environmentally Safe Primer (ESP) – a traditional, electric motor-driven primer pump.
- Arrangements were made between Trident Emergency Products, 4-Guys Fire Trucks, and the Winfield VFD to have the new, automatic air primer retrofitted onto E142 by the folks at 4-Guys.

# Overview

- On July 26, 2012, the retrofit installation was completed and E142 was returned to front-line service back in Winfield.
- The retrofit included the complete removal of the electric primer.
- During the course of the next several days, drivers were oriented to the use of the new automatic air primer.
- Once driver orientation was completed, the folks at Winfield partnered with the folks from GBW Associates, LLC to conduct a few tests on E142.
- This presentation is a summary of a “horizontal-distance” test.

# The Process

- The primer test was rather simple – Engine 142 set-up to draft from a local pond using 100 feet of 6-inch, lightweight suction hose.
- The pumper drafted using the driver's side 6-inch suction intake; and discharged water through its high-flow discharge.
- Although never “officially” measured, lift was less than 10-feet.



# The Process

- Priming time was measured using the stopwatch feature of a cell phone. Time was started when the pump operator pushed the primer switch and time was stopped when discharge pressure was registered on the pump's master discharge gauge.
- The discharge output was measured by using a Hose-Monster fixed pitot diffuser device supplied by the pumper's high-flow discharge via 50-ft of 4-inch LDH.
- There were two tests done using the 100-ft criteria - one using a dry fire hydrant and one using a floating strainer.

# Test Pumper

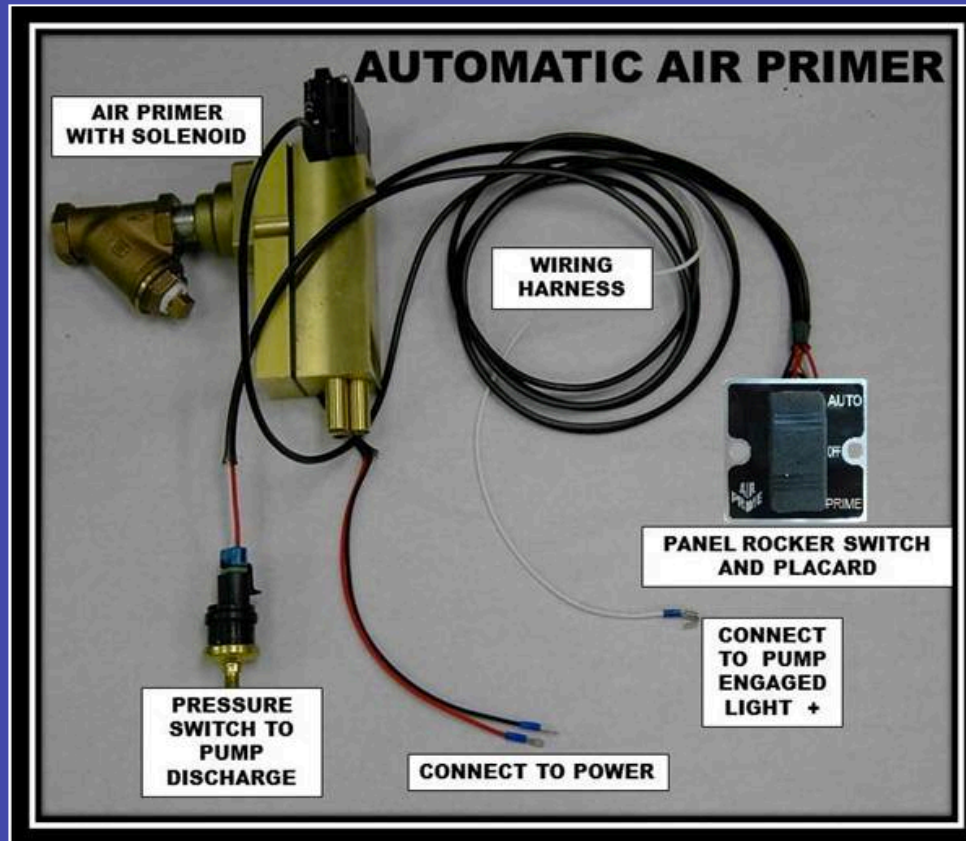


Winfield Community VFD's Engine 142 – a 2007, 4-Guys pumper with a Hale 1,500 gpm single-stage, QMax pump and a 4-inch high-flow discharge.

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# Test Primer



The test primer was the new, Automatic Air Primer made by Trident Emergency Products. The primer was installed on E142 by 4-Guys.



# Flow Test #1 – Set-Up



100-feet of 6-inch hard suction hose was connected to the driver side 6-inch suction intake on Engine 142. The other end of the suction hose was connected to a 6-inch dry fire hydrant at a local pond.

# Flow Test #1 – Set-Up



The total lift was less than 10 feet – however, an absolute measurement was not obtained. Disregard the fire hydrant in the foreground – it is an old, out of service hydrant.



# Flow Test #1 – Set-Up



While flow was not the main purpose of the test, the folks decided to measure what the pumper could flow while drafting through 100 feet of suction hose. A Hose Monster flow diffuser with fixed pitot was used to measure the flow. The diffuser was supplied by a 50-ft length of 4-inch hose from E142's high-flow discharge.

# Flow Test #1 – The Results



Time was started when the driver pushed the air primer's control switch. Time was stopped at 2:40 minutes when the pump was primed and discharge pressure was noted on the master discharge gauge.





# Flow Test #1 – The Results



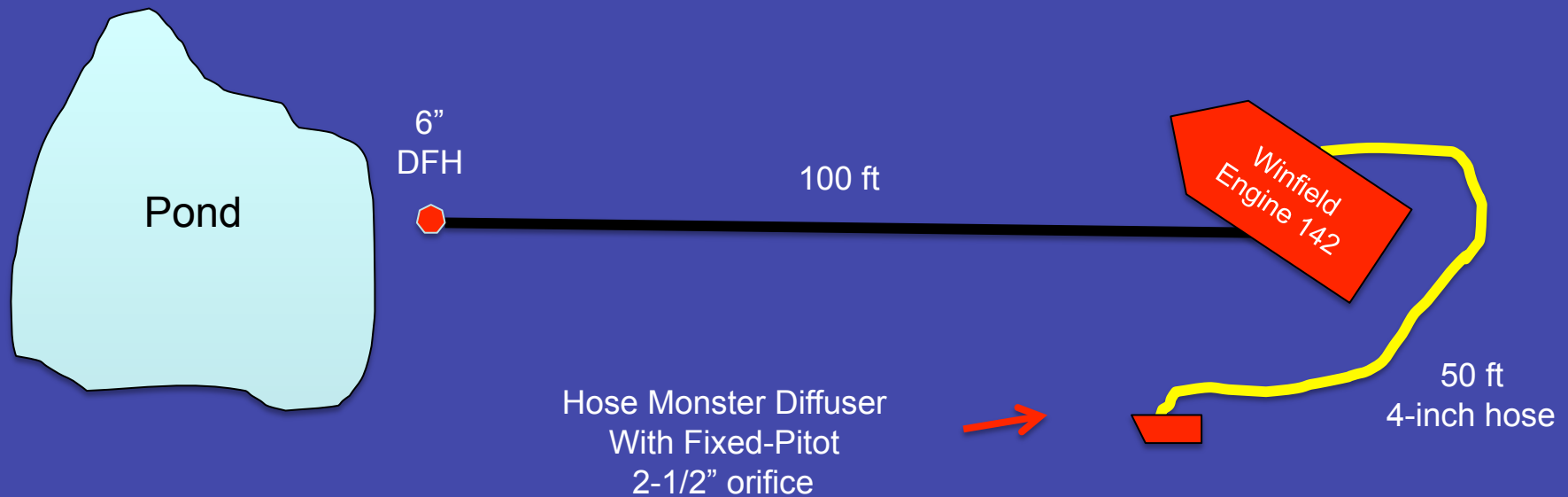
The Hose Monster recorded a pitot pressure of 22 psi which converts to 791 gpm.



# Flow Test #1: The Results

Priming Time = 2:40 minutes  
Hose Monster 22 psi Flow = 791 gpm  
Tachometer = 1,450 rpm

— = 6" suction hose



# Flow Test #1 – A Problem



There were many air bubbles seen in the suction hose during the test. The dry hydrant was checked and a significant air leak was found at the swivel. The air leak could not be fixed so the operation was switched to a floating strainer.

# Flow Test #2 – Set-Up



The 100 feet of suction hose was disconnected from the dry hydrant and reconnected to a 6-inch floating strainer. Flow Test #2 was ready to begin.



# Flow Test #2 – Set-Up



As before, time was started when the operator pushed the switch to activate the air primer.

# Flow Test #2 – The Results



At the 51-second mark, water had traveled 50 feet through the suction hose and the test was well on its way to a better result than Flow Test #1.

# Flow Test #2 – The Results



Time was stopped at 1:53 minutes when water reached the pump and discharge pressure registered on the pump's master discharge gauge.



# Flow Test #2 – Set-Up

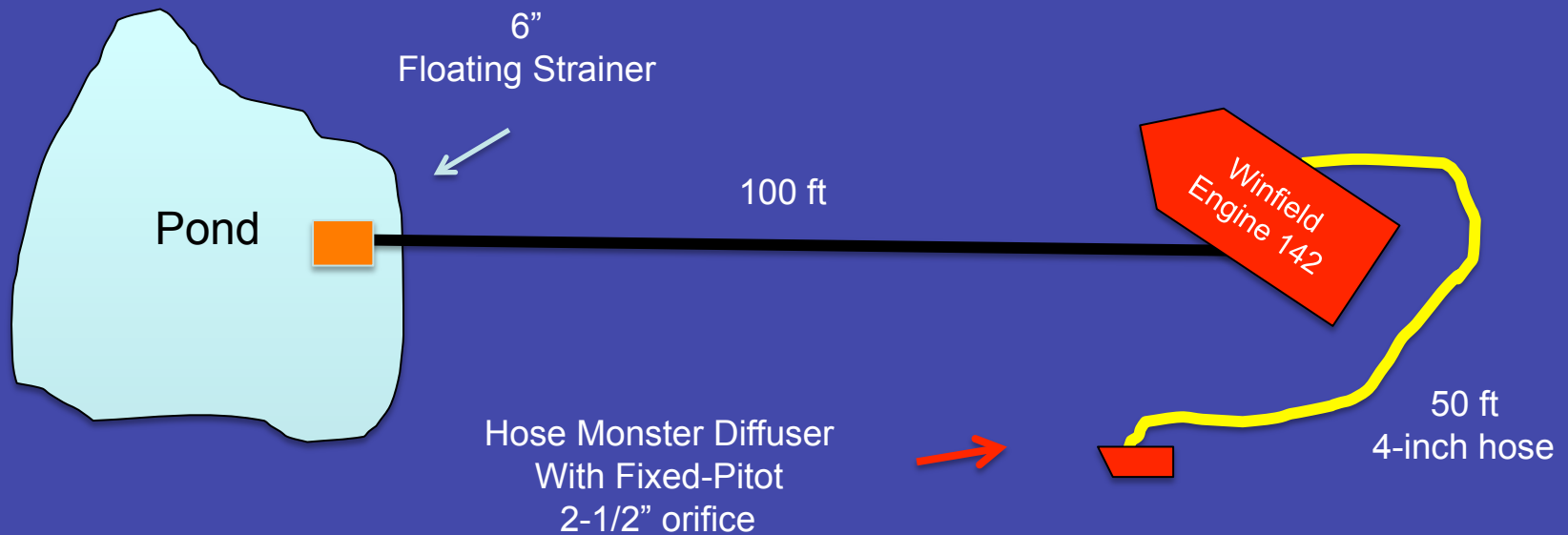


The Hose Monster pitot recorded a pressure of 36 psi which converts to 1,012 gpm – which is pretty good given the 100 feet of suction hose!

# Flow Test #2: The Results

Priming Time = 1:53 minutes  
Hose Monster 36 psi Flow = 1,012 gpm  
Tachometer = 1,450 rpm

— = 6" suction hose





# Summary

- These flow tests clearly illustrate that a pumper CAN draft through more than the traditional 20 feet of suction hose.
- The results of these flow tests reinforce the need for rural pumpers to carry more than 20-feet of hard suction hose.
- The results also show the capability of the automatic air primer – the device has no moving parts and does not put a “drain” on the vehicle’s electrical system.
- Plus – the air primer was run for almost 3-minutes straight in Test #1 with no worries about damage to the primer.

# Summary

- Regarding the flow that was achieved, both tests maximized the pumper's ability using a single suction inlet at that distance.
- In both tests, a motor speed of 1450 rpm was the point at which a further increase in motor rpm produced no increase in pump output.
- GBW Associates, LLC wishes to thank Trident Emergency Products, 4-Guys Fire Trucks, and the Winfield Community VFD for working on this project together.



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