# Gaining Access

## Exploring an alternative to drafting

Story & Photos By
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In the past several columns, I've discussed drafting operations at length. In many cases, however, fire department pumpers can't access or draft from static water sources. Historically, in those cases, the only alternative was to use one or more portable pumps, which firefighters had to carry to the source, set up to draft and pump through discharge lines to pumpers or fill tankers.

One relatively new device that can save rural firefighters time and energy when a water source is inaccessible by pumper: the TurboDraft.

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**Figure 1.** Here is the standard TurboDraft with 2½" and 5" hoselines connected. The 2 ½" or "motive" line supplies the water to operate the TurboDraft. The 5" line serves as the supply line from the TurboDraft to the pumper or other device. Depending on conditions explained in this article, a 200-gpm flow through the 2½" line can cause the TurboDraft to pick up an additional 800 gpm and deliver it through the 5" hose to a pumper or other device.

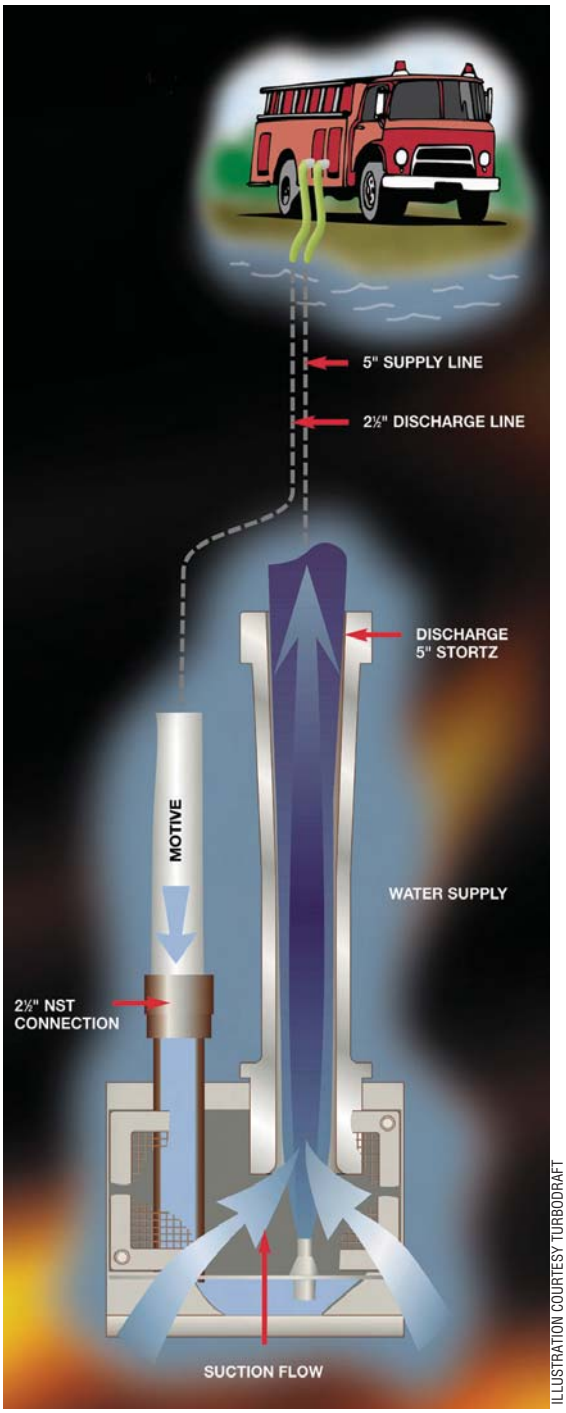


ILLUSTRATION COURTESY TURBODRAFT

**Figure 2.** The design of the TurboDraft creates a venturi where the water from the 2½" line exits the nozzle and enters venturi tube. The venturi creates negative suction that draws additional water in through the strainer for discharge into the 5" line.

**Figure 3 above:** The original version of the TurboDraft was a modified marine eductor that Schutte and Koerting have manufactured for the Navy for shipboard firefighting for years. This test was conducted in Glastonbury, Conn.

**Figure 4 above right:** In the Glastonbury test, a pumper used its booster tank to supply the motive line to the TurboDraft. The flow from the pumper equaled about 200 gpm. The 5" line from the TurboDraft to the pumper's intake supplied the pumper with about 800 gpm. Once the 5" line was charged, the pumper's deck gun was opened to flow the excess 600 gpm. This testing helped lead to the redesign shown in Figure 1.

## SOME HISTORY

My first experience with the TurboDraft was in the mid-90s when I lived in Glastonbury, Conn. Stephen Haynes, then fire chief of the Glastonbury Fire Department, invited me to watch as he tested a prototype of a new rural water-supply device developed by Schutte and Koerting, two of his friends in Pennsylvania. Figures 3 and 4 show this test.

## THE ROYERSFORD TESTS

Figures 5 and 6 show a perfect application for the TurboDraft. Here, the Humane Fire Company of Royersford, Pa., utilizes a TurboDraft to access the Schuykill River at a point not accessible for drafting. The lift in this case equaled 10 feet and the distance between the TurboDraft and the pumper equaled 150 feet. The portable monitor shown in Figure 6 discharges the excess flow delivered by the TurboDraft.

The TurboDraft is a great tool for accessing water sources that a pumper can't reach. And at only 52 lbs., it delivers a high flow rate compared to that of a much heavier portable pump.

## APPLICATIONS

Firefighters can utilize the TurboDraft in a variety of ways, such as the common situation shown in Figure 4 in which a pumper uses its tank water to power the unit so it can deliver flow to the pumper's intake through 5" hose. The pumper then discharges the excess water to whichever fire-attack devices, relay pumpers or tanker fills are needed. The pumper

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**Figure 5.** The TurboDraft is placed into the Schuykill River.

**Figure 6.** The Humane Fire Company's pumper supplies the TurboDraft through a 2½" line, which in turn supplies the pumper with about 800 gpm through the 150-foot 5" line. The pumper then used the excess water to supply the portable monitor with more than 500 gpm.

## Theoretical TurboDraft Usable Flows

| Length of 5" Hose | Lift (ft) | Pump Discharge Pressure | Max. Usable Flow (gpm) |
|---|---|---|---|
| 50 ft | 10 | 175 psi | 670 |
| | 20 | 175 psi | 470 |
| 100 ft | 10 | 180 psi | 570 |
| | 20 | 180 psi | 400 |
| 150 ft | 10 | 185 psi | 480 |
| | 20 | 185 psi | 325 |
| 200 ft | 10 | 190 psi | 440 |
| | 20 | 190 psi | 280 |

COURTESY SCHUTTE AND KOERTING

**Figure 7.** This table shows the maximum theoretical usable flows available with various lifts and hoselay lengths. As you can see, the length of 5" discharge hose and the lift impact the flow and require higher discharge pressures.

operator monitors the incoming 5" supply line and maintains sufficient flow to recirculate to the TurboDraft to keep it operating properly. You can do this by pulling the incoming pressure down to the point where the 5" line becomes spongy, and then reducing the discharge a bit. (Photos 8–17, courtesy of Shutte & Koerting, show actual field applications.)

You could achieve the same set-up shown in Figures 11 and 12 by using one or two portable pumps with the proper capacities. Performing a follow-up on this application would involve using a mini pumper with a 500-gpm pump to supply two TurboDrafts in the same manner. This would allow the 500-gpm pumper to deliver close to 2,000 gpm.

**Figure 8.** This is a perfect application of the TurboDraft. With lines preconnected, one person can easily deploy it.

**Figure 9.** Fire departments in Bucks County, Pa., operate at a dump truck vs. gasoline tanker accident that spilled gasoline and required foam standby lines.

**Figure 10.** Due to a limited tanker shuttle area, firefighters dropped a TurboDraft into the Delaware Canal. The pumper in the foreground operated the TurboDraft and supplied the pumper in the background with water for foam standby lines.

**Figure 11.** In this case, a mini pumper with a 300-gpm at 150-psi fire pump drafts from a water source to supply the TurboDraft. But instead of the 5" discharge line feeding the mini, the 5" line supplied a pumper on the main road.


**Figure 12.** The mini and the TurboDraft supplied this pumper with 870 gpm.

**Figure 13.** The pumper in the foreground operates a TurboDraft to a water source 100 feet to the left of the pumper, and it uses the excess water to fill tankers at a water shuttle fill site.

**Figures 14 and 15 above:** Here, the Fenton Township Fire Department operates a TurboDraft. The water source is a lake on which numerous condos have been built. The blue float holds the TurboDraft off the bottom, but about two feet below the surface of the water. Figure 14 shows the pumper, which has set up the TurboDraft and is preparing to discharge through its deck gun. Figure 15 shows the TurboDraft supplying the pumper with more than 500 gpm.

## CONCLUSION

Various forms of water eductors have been around for a long time, but nobody ever developed one that could deliver flows as high as those possible with the TurboDraft. For more information on the TurboDraft, visit www.TurboDraft.net or e-mail TurboDraft@s-k.com.

To find out how you can obtain a PowerPoint presentation of this article, contact Larry Davis at his email address below.

Larry Davis is a full member of the Society of Fire Protection Engineers, a Certified Fire Protection Specialist and a Certified Fire Service Instructor II with more than 30 years experience as a fire service instructor. He is vice president of GBW Associates, LLC, and the chairman of the newly created Rural Firefighting Institute.

Davis has conducted more than 400 Rural Firefighting Tactics and Rural Water Supply Operations seminars throughout the United States and Canada. In addition, he has written numerous fire service texts, including "Rural Firefighting Operations," books I, II and III. Most recently, Davis co-wrote the "Rural Firefighting Handbook" and "Foam Fighting Operations," book I with Dominic Colletti. Reach Davis at ldavis@gotbigwater.com or ldavis@RFI411.org.


**Figure 16.** This department is using a single engine to supply two TurboDrafts (into a stream), which are supplying the pumper with a net flow of 932 gpm.

**Figure 17.** Here are two TurboDrafts equipped with floats to hold them off the bottom of the stream.