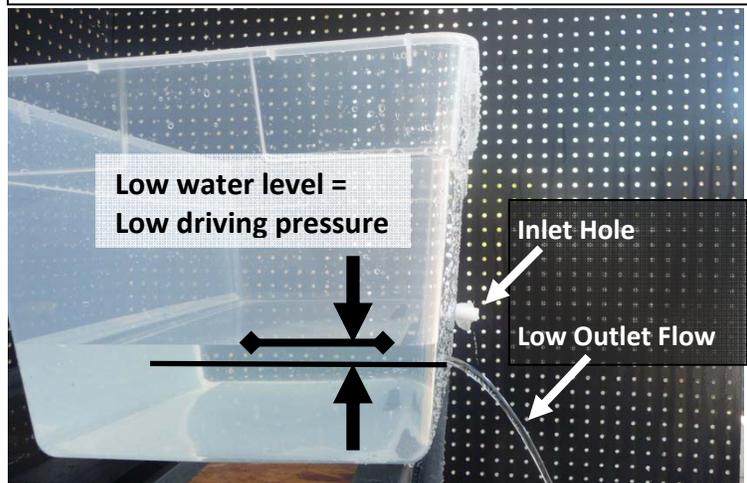


Positive Pressure Ventilation works on two principles. 1) Build pressure, 2) Pressure forces ventilation
 The illustration uses a common sense comparison of water pressure and flow to understand key variables of PPV.

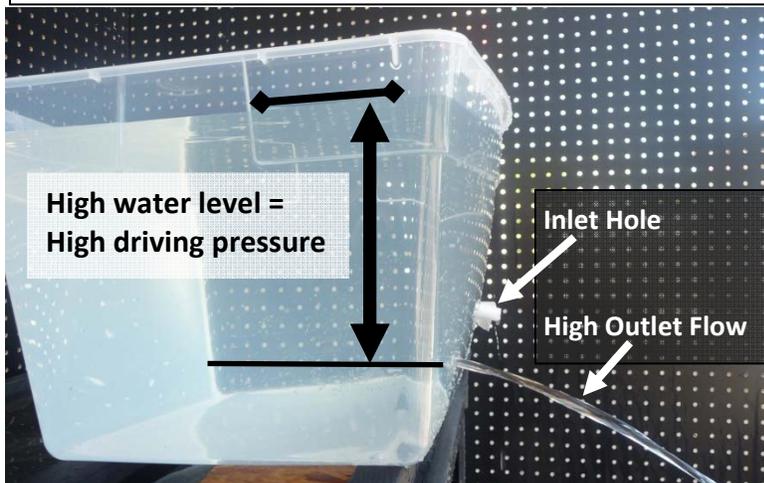
****The test compares the effectiveness of PPV Cone vs PPV Jet.****

PPV Fans		Water Test Comparison
Fan drives air into a doorway	Flow in	Stream driving water in the Inlet Hole
Pressure in the structure (compressed air)	Driving Pressure	Pressure in the tub (increase Water Level)
Air flow out of the structure, ventilation	Flow out	Water flowing out of the tub Outlet Hole

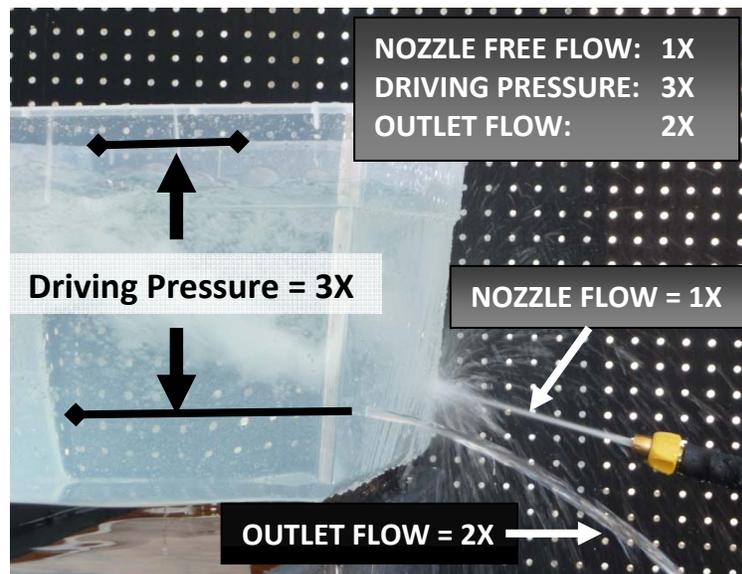
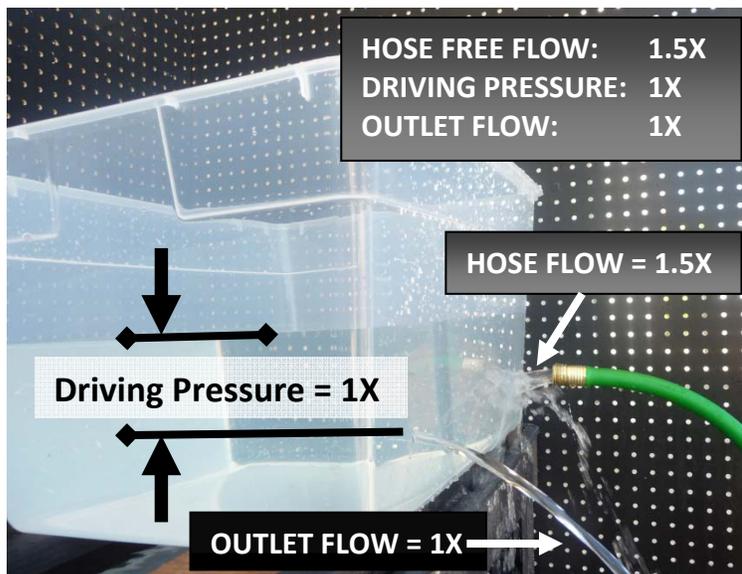
Low water level = Low driving pressure
Result: Low outlet flow



High water level = High driving pressure
Result: High outlet flow



Test



Conventional PPV Cone Approach-High Volume/Low Pressure	BlowHard PPV Jet Approach-Low Volume / High Pressure:
Approach: High Volume, Low Pressure Fans provide a high volume cone of pressurized air to "seal" the inlet door increasing pressure inside the structure. (A wide cone area results in low pressure)	Approach: Low Volume, High Pressure Fans provide a low volume jet of high velocity air to penetrate the inlet door increasing structure pressure. (A concentrated jet area results in high pressure)
Comparison: High volume water stream flowing from a hose. **The hose uses a high volume of water at low pressure to "seal the hole" and drive water into the tub.	Comparison: High velocity water jet shooting from a nozzle. **The nozzle has a low volume of water at high pressure to penetrate the hole and drive water into the tub.

Results

Hose		Nozzle
Cover hole with high water volume at low pressure	<i>Approach</i>	Penetrate hole with low water volume at high pressure
Good flow into tub at low pressure, flow into the tub dwindles as tub pressure increases.	<i>Flow</i>	Good flow into the tub at low pressure, maintains flow into tub as pressure builds.
Low. Outside edge of stream splashes outward as it hits the perimeter of the inlet hole. Reached equilibrium at a low pressure. Hose distance from the inlet hole was very limited for maximum pressure. As an additional test water was added above equilibrium; the increased tub pressure overcame the hose pressure resulting in water flowing out the inlet hole. There was a visible clash of the two streams of water outside the tub.	<i>Pressure</i>	High. Minimal to zero water leakage around inlet hole at low pressure. Water begins to leak around jet stream at high pressure but the jet continued to drive water into tub. Nozzle distance from hole had little impact on ability to build pressure. Jet continued to drive water into the tube, did not reach equilibrium/maximum pressure.
Low Outlet Flow (1X outlet the stream of water in test)	<i>Result</i>	High Outlet Flow (2X outlet the stream of water in test)

*****The BlowHard PPV Jet Approach results in clearing the structure faster because of the higher pressure. In addition, this test shows fans rated at high CFM may not be capable of building sufficient pressure for ventilating a structure.***



With a Jet Approach to PPV the BlowHard BH-20 is able to build more pressure than the conventional approach resulting in increased ventilation. The BH-20 is capable of air movement equivalent to fans rated 15,000 CFM or higher in real-world conditions.

Notes: Approximate hose water stream diameter is .75-inches; approximate nozzle water stream diameter is .25-inches. To accurately simulate the two theories of “sealing the door” and “penetrating the door” the inlet hole is sized accordingly. The inlet hole diameter is set to .625-inches.

1. Cone Approach: An inlet hole diameter of .625-inches will ensure the .75-inch stream of water from the hose can “seal the hole” but allow maximum water flow into the tank.
2. Jet Approach: An inlet hole diameter of .625-inches will maximize potential leakage around the .25-inch jet stream of water from the nozzle. This potential leakage tests the ability of the jet stream to utilize entrainment and momentum to maximize water flow into the tub and ability to maintain tub pressure.