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Air Leakage Test Report

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A. General Notes & Information

Assessors Name: Elm Energy Group – J.Kaye **RESNET RTIN #:** 0340610
BPI Audit #: 5011671
Client's Name: Flood Flaps
Address: 3594 Holmgren Street, Mt. Pleasant, SC 29466
Website: www.floodFlaps.com

Purpose of Test: Pressure Testing for Air Leakage Comparison of Flood Vents
Test Date: 2/3/14
Approx. Volume of Testing Chamber: 833 ft3+ (cubic feet)

B. Pressure Testing Results

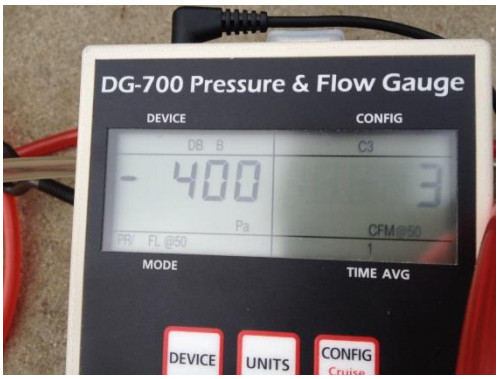
Why do we focus on "Air Infiltration"?

"Air Infiltration can account for 30% or more of a home's heating and cooling costs and contribute to problems with moisture, noise, dust, and entry of pollutants, insects, and rodents."
- NC State University, NC Solar Center

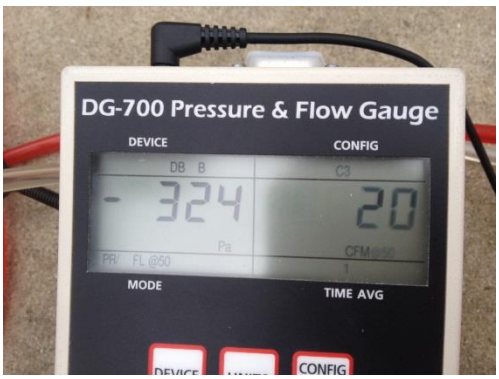
A closed crawlspace's enemy is ambient outdoor air moisture, evaporation of moisture from the earth and bulk water intrusion. If a crawlspace is well-sealed the result is better protection of that environment's impact on indoor air quality, better control over the durability of the materials in that space, as well as increased energy efficiency and interior comfort gains.

RESULTS @ 50 Pascals

Flood Flaps



Competitor's Vent



The Flood Flaps vent allowed us to depressurize the chamber up to 475 Pascals of pressure. For the final test, we tested up to 400 Pascals which represented ~ a 57 mph wind. At that pressure and velocity, the manometer's adjusted reading for cfm of leakage at 50 Pascals was 3 cfm.

The Competitor's flood vent only allowed depressurization of the tank up to ~325 Pascals of pressure. This represented ~ a 51 mph wind. At that pressure and velocity, the manometer's adjusted reading for cfm of leakage at 50 Pascals was 20 cfm. That represents nearly 7 times the leakage of the Flood Flaps.

C. Analysis

We were asked to come and test the air tightness of the Flood Flaps flood vent versus a Competitor product. There is not a test that is designated for testing the air tightness of flood vents, but this test was completed in a manner that represented fairness for both vents and simulated tests that allowed for the comparison of the leakage in the defined area of the test tank chamber.

The test tank dimensions were 40.125” tall, 47.375” deep and 63.125” wide. That represents approximately 833 cubic feet. With such small leakage rates on this tank, the testing was completed with a Minneapolis Duct Blaster™ to gain the results.

The serial number of the fan is # 11861 and the serial number of the DG700 Manometer is 34918-7-700. The manometer was last calibrated on May 23, 2012.

Wind speeds were in excess of 10mph during the test. To mitigate wind effects on the manometers reading, excess hose length was used and the hose was place in the garage area close by, but away from wind currents and ambient air pressure fluctuations.

For the test, the Flood Flaps vent was installed upon our arrival. Per the company, the vent was installed to their specifications with caulking sealing around the perimeter of the wall opening. When the change over from the Flood Flaps to Competitor’s vent occurred, all proper installation techniques were followed per that manufacturer’s specifications. Additional caulking was applied to the rim of the Competitor’s flange around the vent where it seats against the wall around the rough opening being sealed with the vent. Both installations represented best practices and appeared to be typical, yet well installed.

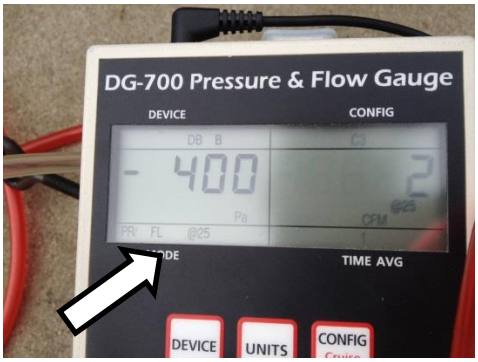
The testing was completed by depressurizing the right chamber test tank. The right chamber of the holding tank was covered by a double layer of plywood that was sealed to the tank with a foam gasket material like a sill seal product used in construction. There was an 8” hole cut in the top of the cover for the right side of the tank which is where we tied in our fan for depressurization. The left side was left accessible via a removable plywood cover for access to the front of the vent for smoke testing.

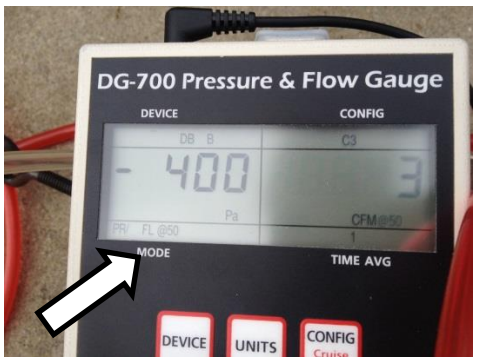
Several tests were completed with smoke to visually demonstrate the leakage of the flood vents. The first smoke test was completed with a Wizard Stick smoke pen that allowed for a direct stream of smoke to be aimed at the vents. For the Flood Flaps vent, this smoke wafted around in the left (unsealed) chamber and did not have any direct stream that seemed to be pulled into the depressurized right side chamber. For the Competitor’s vent, the same is not true. The Competitor’s vent had numerous leakage pathways connecting the left unsealed chamber to the simulated ‘sealed crawlspace’ of the right chamber. No smoke wafted during the testing of the Competitor’s vent and at 6”+ away from the face of the vent, the depressurized chamber continued to draw the smoke stream directly into it from the breaches in the seal. This was markedly different than the Flood Flaps and proved to be an average of 7 times leakier at varying pressures.

The second test that was completed on both systems was where the left chamber in the tank was filled with smoke from a theatrical fog machine while the right side was depressurized again. The results from this test proved to be similar to the first smoke test. The Flood Flaps vent allowed for very small amounts of smoke to seep, or be pulled into the right chamber, while the Competitor's vent quickly allowed for the right side of the chamber to fill with smoke from the theatrical fog machine.

The tests demonstrated a superior air seal from the Flood Flaps vent while the Competitor's vent allowed for significantly more air leakage and bypasses between chambers and proved to *not* be air tight. This was demonstrated from the pressure readings taken from the manometer and from the 2 visual smoke tests completed while the depressurization of the right chamber was in effect.

More pictures from the testing are below.





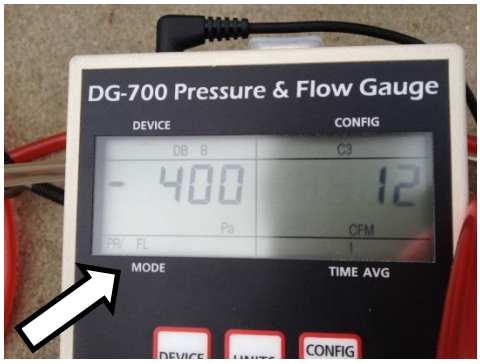


Photo above show the results from the ***Flood Flaps*** vent installed in the testing chamber.
The **photo above left** shows the adjusted leakage at 25 Pascals which was 2 CFM.
The **photo above middle** shows the adjusted leakage at 50 Pascal which was 3 CFM.
The **photo above right** shows the leakage at 400 Pascals which was 12 CFM.

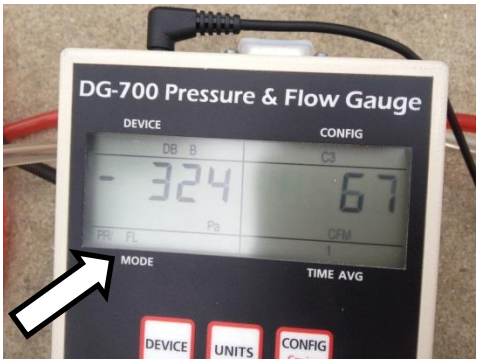


Photo above show the results from the Competitor's flood vent installed in the testing chamber.
The **photo above left** shows the adjusted leakage at 25 Pascals which was 14 CFM. (7 times Flood Flaps)
The **photo above middle** shows the adjusted leakage at 50 Pascals which was 20 CFM. (~7 times Flood Flaps)
The **photo above right** shows the leakage at 324 Pascals which was 67 CFM. (~7 times Flood Flaps)

Completed By: Jamie Kaye
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