## Using the DG-700 and TECLOG to Measure Worst Case Fan Depressurization and Appliance Draft

Buildings with natural draft combustion appliances should be routinely tested to ensure that the spillage of combustion products into the building is unlikely. Combustion safety testing is critical because of the potential for severe health effects from spillage susceptible appliances, including carbon monoxide poisoning. Building depressurization, caused by exhaust fans, dryers, unbalanced forced air distribution systems, and duct leakage can be a major cause of appliance spillage. As buildings (or combustion appliance rooms) are made tighter, these problems can be made worse, although very leaky buildings can also have venting problems related to depressurization. One way to determine how the combustion appliances respond to changes in building pressures is to perform a worst case depressurization test, along with an appliance draft test.

If you have a DG-700 gauge (or a DG-500 or APT data acquisition box) and a laptop computer, you can easily perform and graphically document these important tests. All you need is a copy of our TECLOG for Windows software (available for free at www.energyconservatory.com) and a standard 9 pin serial cable to connect the DG-700 gauge to your computer. Using TECLOG along with your DG-700 gauge you can capture and record the two best indicators of venting performance, namely the pressure in the Combustion Appliance Zone (CAZ) and the appliance draft pressure. (Consult Chapter 10 of the Minneapolis Blower Door Operation Manual for more details on combustion safety testing.)

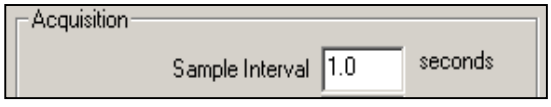
### Getting Started/Example File

Below is a quick summary of what is involved in performing these tests. This summary uses an example test file recorded on a house with a natural draft water heater (the furnace was sealed combustion).

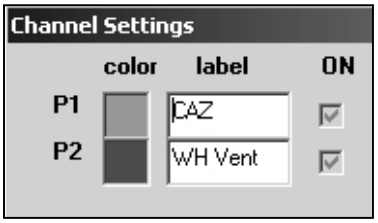
1. Set up your DG-700 to measure both the CAZ pressure and the vent pressure for a natural draft appliance. Since we want to measure the CAZ pressure with reference to outside, you will need to connect the **Channel A** Reference tap to an outside pressure hose. Leave the **Channel A** Input tap open to the CAZ (assuming the gauge is in the CAZ). Connect the **Channel B** Input tap to a static pressure probe installed in the appliance vent. Leave the **Channel B** Reference tap open to the CAZ.

2. Connect the DG-700 to your computer using a 9 pin serial cable, and turn on the computer and gauge. Make sure all fans and combustion appliances are off. (**Note:** If your computer does not have a serial port but does have a USB port, you will need to purchase a USB to serial adapter - contact TEC for recommendations).

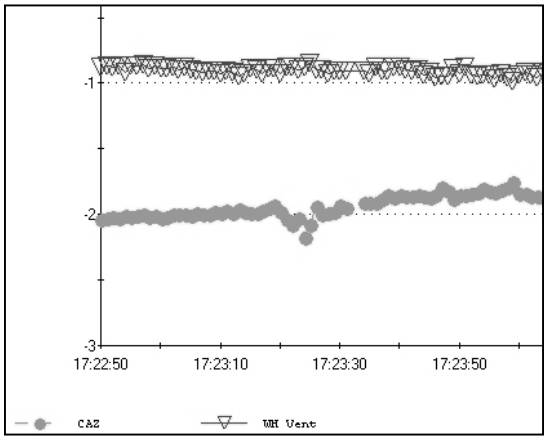
3. Start TECLOG and open the **Configuration Settings** window (click on **Configuration….Settings).** Enter **1.0** seconds into the **Sample Interval** field (this tells TECLOG to take one second average pressure readings).



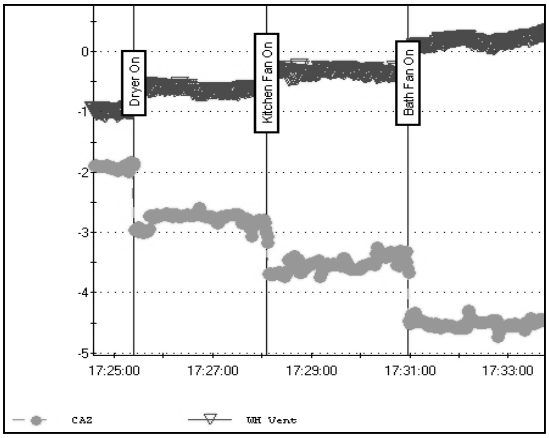
4. Now open the **Channel Settings** window (click on the "**View and Edit Channel Settings**" button). In the **label** fields, type in appropriate labels for P1 and P2 (these correspond to **Channels A** and **B** on the DG-700). These labels will appear on the graph generated by TECLOG. After typing in the labels, exit both the **Channel Settings** and the **Configuration Settings** windows.



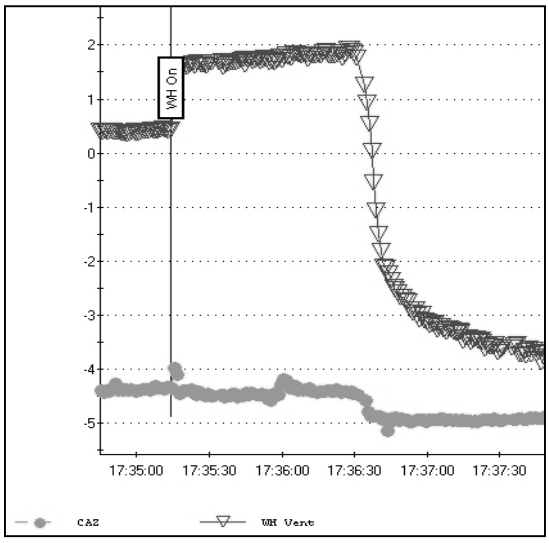

5. Begin data recording using the **Recording….Start Recording** menu item. After entering a filename, data collection and recording will begin. TECLOG will display a graph showing the CAZ pressure and the appliance draft pressure. In the graph to the right, the baseline CAZ pressure is approximately –2 Pa (typical cold climate wintertime pressure) while the baseline water heater vent pressure is about –1 Pa.




6. Turn on exhaust fans one at a time. Each time an exhaust fan is turned on, TECLOG graphically displays the change in both the CAZ pressure and the vent pressure. In this case, a dryer, a kitchen fan and a bath fan were turned on. The CAZ becomes more depressurized with each successive fan, until the CAZ pressure was about –4.5 Pa with all fans running. This represents a measured worst case fan depressurization of -2.5 Pa (from –2 Pa baseline to –4.5 Pa with all fans running). The graph also shows that the water heater vent pressure becomes slightly positive with all fans running, indicating that outside air has begun to come down the water heater venting system. **Note:** The air handler fan did not cause a change in CAZ pressure.




7. Now turn on the water heater with all fans continuing to run. In this case, the water heater immediately begins to spill into the house due to the downdraft in the vent (note the positive vent pressure). The water heater continues to spill for about 90 seconds at which time the venting system finally warms up, suddenly reverses and begins to operate properly. Once the venting system overcomes the downdraft, the water heater draft is a strong –4 Pa.




8. Stop data recording using the **Recording….Stop Recording** menu item.

Although this testing can certainly be done without TECLOG, using TECLOG gives you better documentation of what you found, more definitive measurement of the pressure changes and a more professional way of reporting the results to your client.

## Other Hints

- Create a TECLOG configuration file which stores all of the channel and configuration settings needed to do your testing. Then simply load the configuration file using the **File….Load Configuration** menu item and you are ready to go.

- Use a notebook to jot down the times at which you turned on or off the exhaust devices and air handler. Make sure to synchronize your computer clock with your watch before starting. These "events" can then be added to your test file by using the TECLOG **Event Marker** tool (as shown in the graphs above).

- Use the **Stats** tool to quickly determine the average pressure reading for any selected portion of the graph.