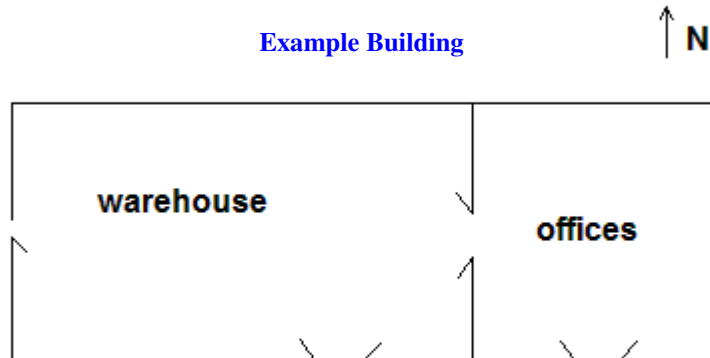


## **Example Multi-Fan Airtightness Test with TECLOG2 Setting up and Conducting a Test**

### **Introduction:**

This paper documents how TECLOG2 was used to conduct multi-fan blower door depressurization and pressurization airtightness tests on a large multi-use building. The building tested consisted of two large side-by-side spaces, one side is office space and the other side is a warehouse. The two spaces are separated by a sheetrock wall which includes double doors allowing access between the office and warehouse spaces. The entire structure has an airtightness level that required 4 blower door fans to induce a change in building envelope pressure of approximately 75 Pascals.



TECLOG2 is The Energy Conservatory's (TEC) data logging program. TECLOG2 is designed to work with up to 16 DG-700 digital pressure gauges to monitor and store data from differential pressure channels, and to provide computerized control of multiple Minneapolis Blower Door fans. The program provides easy control of data acquisition parameters and includes a feature to calculate multi-fan airtightness test results.

### **Step 1: Document the Floor Plan, and the Locations of Blower Door Fans and Pressure Measurements.**

For complicated buildings and especially when using TECLOG2 for the first time, it is helpful to fill in the TECLOG2 configuration worksheet before entering the configuration settings into the program. A blank copy of this worksheet is found under the TECLOG2 help menu.

The top of the configuration worksheet contains space for a simple building floor plan. It is always helpful to mark down the approximate locations of fans and pressure gauges, as well as the tubing and outdoor terminations. For this test, we used a total of 4 blower door fans and 5 DG-700 gauges (10 total pressure channels). We installed a 3-fan blower door system in an exterior door in the warehouse, and a single fan system in the exterior door of the smaller office area. We also measured the building envelope pressure with reference to (WRT) outside on all 4 sides of the building. TECLOG2 allows us to average the 4 building envelope pressure measurements into a single pressure reading. We have found that this technique greatly reduces envelope pressure fluctuations from wind. Finally, we also measured the differential pressure between the offices and warehouse to check for pressure uniformity during the test.

The bottom portion of the configuration worksheet is used to record the serial numbers of the DG-700 gauges being used, to document what each pressure channel is being used to measure (i.e. channel label), and to provide a label for each gauge (i.e. gauge label). In this test, a total of 9 pressure channels were used (4 for fan flows, 4 for building envelope pressure WRT outside, and 1 for the inter-zonal pressure). One of the DG-700 pressure channels was left unused.

## Completed Configuration Worksheet

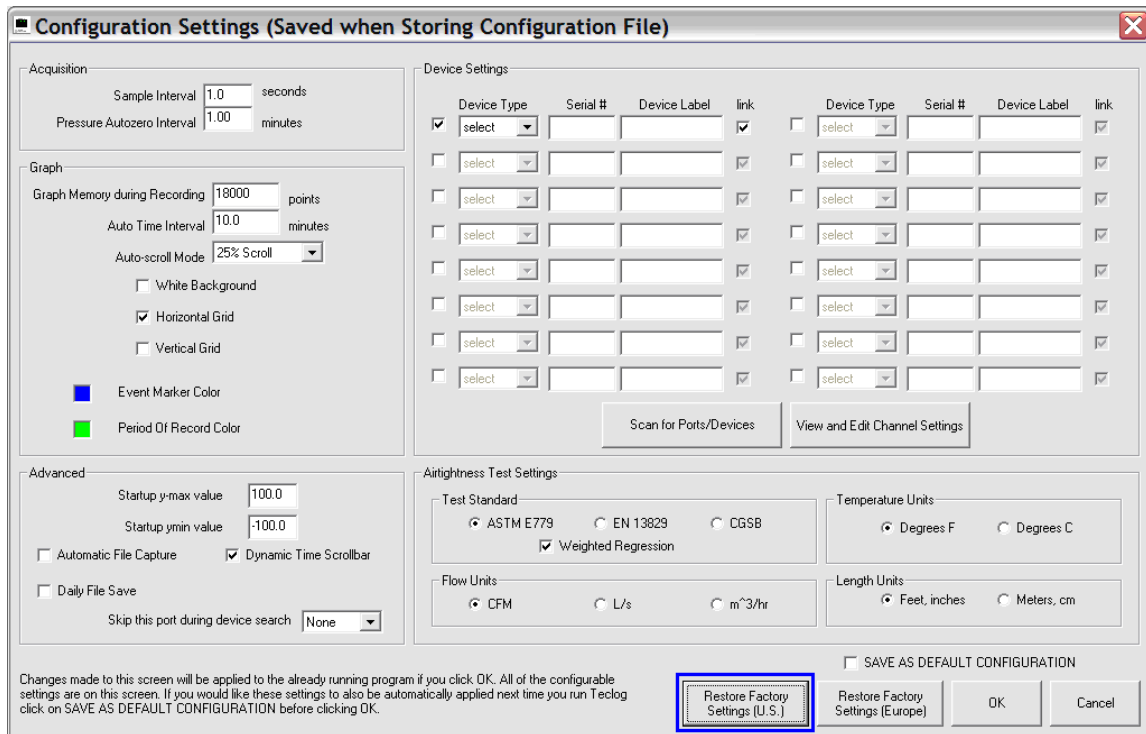
TECLOG2 Device Configuration Worksheet

Serial <u>24302</u> Label <u>ware1</u> Chan A <u>BP-West</u> Chan B <u>F1-low</u>	Serial _____      Label _____ Chan A _____    Chan B _____
Serial <u>23948</u> Label <u>ware2</u> Chan A <u>F2-mid</u> Chan B <u>F3-top</u>	Serial _____      Label _____ Chan A _____    Chan B _____
Serial <u>13159</u> Label <u>ware3</u> Chan A <u>BP-North</u> Chan B <u>unused</u>	Serial _____      Label _____ Chan A _____    Chan B _____
Serial <u>23945</u> Label <u>ware4</u> Chan A <u>BP-South</u> Chan B <u>interzonal</u>	Serial _____      Label _____ Chan A _____    Chan B _____
Serial <u>23946</u> Label <u>office</u> Chan A <u>BP-East</u> Chan B <u>F4-single</u>	Serial _____      Label _____ Chan A _____    Chan B _____

### Step 2: Edit the TECLOG2 Configuration Settings.

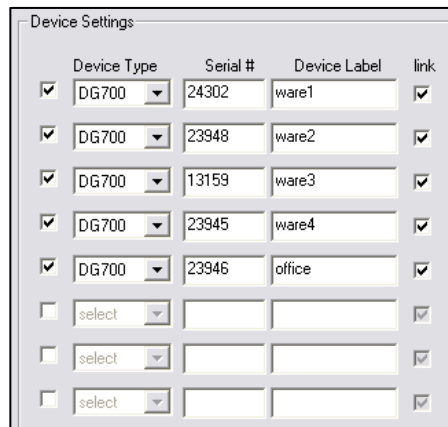
Once the configuration worksheet is completed, we are ready to enter the configuration settings into TECLOG2. Choose **Settings** from the **Configuration** Menu at the top of the TECLOG2 screen.

If this is the first time you have used TECLOG2 on this particular building, it is a good idea to click on **Restore Factory Settings (U.S.)**. This puts TECLOG2 into a known condition and provides a basis for the following discussion. The Factory Settings (U.S.) are shown in the screen below. **Note:** If you have tested this same building before, you can load all of the configuration settings by loading a previously stored TECLOG2 data file, or by loading a previously saved TECLOG2 configuration file.



### a. Device Settings.

The first step is to enter the device settings for the DG-700 gauges that will be used during the test (5 in this example).



Each device gets entered on a separate line in the Device Settings section (the left check box must be checked in order to activate each line). Choose the **Device Type** from the drop down list, enter the device **Serial #**, and a **Device Label** of your choice. The **link** checkbox refers to the device's relationship to the **Master Fan Control Slider** and **Master Cruise Control** (see below). Selecting this option causes the DG-700's fan output port to be linked to both of the Master Fan Controls. This linked or unlinked status can be changed during recording. For each DG-700 that you want to be controlled by the Master Fan Controls, check **link**. For each DG-700 that you would like to be under independent control (for example to facilitate the balance of interior pressures) uncheck **link**. (**Note:** In this example we linked all 5 gauges even though some of the gauges were not used to control fans.)

**b. View and Edit Channel Settings**

Device Type	Serial #	Device Label	link	Device Type	Serial #	Device Label	link
<input checked="" type="checkbox"/> DG700	24302	ware1	<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> DG700	23948	ware2	<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> DG700	13159	ware3	<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> DG700	23945	ware4	<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> DG700	23946	office	<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input type="checkbox"/> select			<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input type="checkbox"/> select			<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>
<input type="checkbox"/> select			<input checked="" type="checkbox"/>	<input type="checkbox"/> select			<input checked="" type="checkbox"/>

Buttons: Scan for Ports/Devices, **View and Edit Channel Settings**

Once you have entered the Device Settings, you need to configure the channel settings for each of the devices. Click on **View and Edit Channel Settings**. A Channel Settings window appears with tab(s) at the top of the window for each of the devices entered. The figures below show the channel settings entered for each of the devices used in the test.

24302 | 23948 | 13159 | 23945 | 23946

### DG700-24302 ware1

Color	Label	On	Channel Type	# Dec	Sensor	Plot Format	Plot Style
A <span style="color: green;">■</span>	BP-West	<input checked="" type="checkbox"/>	Envelope Pressure	1	settings	Symbol and Line	style
B <span style="color: red;">■</span>	F1-low	<input checked="" type="checkbox"/>	Model 3 Fan Flow	0	settings	Symbol and Line	style

Cruise Settings...

24302 | 23948 | 13159 | 23945 | 23946

### DG700-23948 ware2

Color	Label	On	Channel Type	# Dec	Sensor	Plot Format	Plot Style
A <span style="color: red;">■</span>	F2-mid	<input checked="" type="checkbox"/>	Model 3 Fan Flow	0	settings	Symbol and Line	style
B <span style="color: red;">■</span>	F3-top	<input checked="" type="checkbox"/>	Model 3 Fan Flow	0	settings	Symbol and Line	style

Cruise Settings...

24302 | 23948 | 13159 | 23945 | 23946

### DG700-13159 ware3

Color	Label	On	Channel Type	# Dec	Sensor	Plot Format	Plot Style
A <span style="color: green;">■</span>	BP-North	<input checked="" type="checkbox"/>	Envelope Pressure	1	settings	Symbol and Line	style
B <span style="color: red;">■</span>	unused	<input type="checkbox"/>	Pressure	1	settings	Symbol and Line	style

Cruise Settings...

24302 | 23948 | 13159 | 23945 | 23946

### DG700-23945 ware4

	Color	Label	On	Channel Type	# Dec	Sensor	Plot Format	Plot Style
A	<span style="color: green;">■</span>	BP-South	<input checked="" type="checkbox"/>	Envelope Pressure	1	settings	Symbol and Line	style
B	<span style="color: yellow;">■</span>	interzonal	<input checked="" type="checkbox"/>	Pressure	1	settings	Symbol and Line	style

Cruise Settings...

24302 | 23948 | 13159 | 23945 | 23946

### DG700-23946 office

	Color	Label	On	Channel Type	# Dec	Sensor	Plot Format	Plot Style
A	<span style="color: green;">■</span>	BP-East	<input checked="" type="checkbox"/>	Envelope Pressure	1	settings	Symbol and Line	style
B	<span style="color: red;">■</span>	F4-single	<input checked="" type="checkbox"/>	Model 3 Fan Flow	0	settings	Symbol and Line	style

Cruise Settings...

**Color Convention:** Click on a color box to choose a plot color. We recommend the following color convention - **Green** for channel types of building envelope pressure WRT outside, **Red** for fan flows and **Yellow** for interior differential pressures:

**Channel Label:** Enter the channel label from the configuration worksheet.

**On:** Check the **On** box to activate the channel (**Note:** one channel has not been activated in this example because we only need 9 total channels).

**Channel Type:** Select the appropriate Channel Type from the pull down menu. Use **Envelope Pressure** for all building envelope pressures WRT outside, use **Model 3 Fan Flow** for all channels connected to Model 3 blower door fans, and **Pressure** for inter-zonal pressures.

**# Dec:** Select the number of decimal places you want displayed for each channel.

**Sensor Settings:** Do not change – leave factory defaults.

**Plot Format:** Select a plot format, or leave factory defaults.

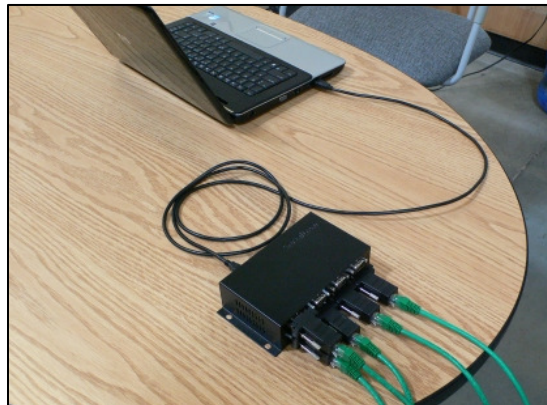
**Plot Style:** Select a plot style, or leave factory defaults.

When you have finished entering the Channel Settings, click on **OK** to return to the main Configuration Settings screen, and then **OK** again to close the Configuration Settings screen.

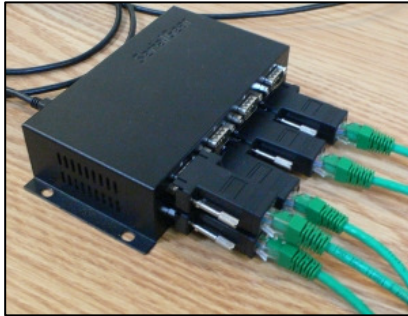
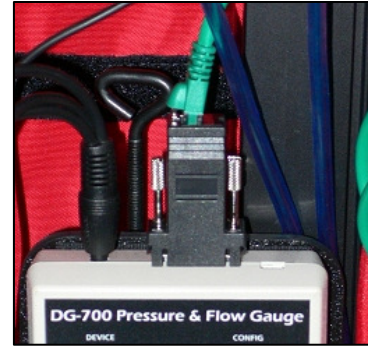
### Step 3. Connecting the DG-700's to Your Computer.

The TECLOG2 program was operated from a single laptop computer located in a central location in the building. In order to connect the 5 DG-700 gauges to the laptop computer, we used the following hardware (**Note:** this is just one example – there are other ways to configure and connect the hardware):

- 1 Eight-Port DB-9 RS232 to USB Adapter Hub (available from USBGear.com - part# **USBG-8COM-M**). This device provides 8 separate RS232 communication ports through a single USB connection to the laptop. While the DG-700 gauge has both USB and RS232 communication ports, we chose to use the RS232 ports on the gauges because RS232 communication allows for much longer cable lengths (we have successfully used cables up to 4,000 feet in length). This is very useful in large buildings.



- 5 sets of DB9 to CAT5 Adapters (a set includes one male and one female adapter – available from TEC). These adapters allow the use of standard CAT5 cable between the gauge and the serial ports, rather than using a long serial cable. CAT5 cable is readily available in many lengths, and 2 lengths of cable can be easily connected together with a CAT5 coupler. The male DB9 to CAT5 adapter is plugged into the DG-700 gauge (pictured at right) while the female DB9 to CAT5 adapter is plugged into the hub (pictured below). CAT5 cable is then plugged into the top of the adapters.



#### Step 4. Method of Fan Control.

Two common fan control methods are described below, along with advantages and disadvantages of each. There are certainly other ways of performing the tests, but a thorough understanding of these two will help you decide how you should conduct your particular tests.

##### a. Computer Control Using Master Fan Slider and Master Cruise Control.

When using the Computer Control method, each blower door fan speed controller should be connected to a DG-700 gauge (using a fan control cable) so that all fans can be controlled using the **Master Fan Control Slider**, or the **Master Cruise Control**. As indicated below, it is possible to connect multiple (up to 6) fan speed controls to a single DG-700 gauge. The **Master Cruise Control** feature controls the fans to get the average building envelope pressure to the targets which you specify. **This is the fan control method used in this test example.**

##### *Advantages*

Easier to get the building envelope pressure to precisely the targets you choose. You may be working with requirements to precisely hit the targets, in which case this may be important to you. (Technically speaking it is not very important precisely which pressures are achieved, as long as the range and even distribution of pressures is adequate and there are enough points to give you the resolution you need.)

Very easy to stop and restart the fans due to an interruption such as someone needing to enter or leave the building, even when many fans are in use.

##### *Disadvantages*

More data is gathered with fans running at less than full speed. This reduces the precision of the flow measurements to some degree. This is really only a problem for positive pressure (pressurization) testing on windy days.

Running the fans at partial speed also leads to higher motor current draw.

- For the 3 fan blower door system installed in the warehouse, we used the fan control output jack on a single DG-700 to control all 3 fans. When using this setup, all 3 fans are controlled together and cannot be independently adjusted (this works well for large building testing). This setup is accomplished by plugging a standard 1 to 3 stereo or mono splitter (3.5 mm or 1/8" plug/jacks) into a DG-700 fan control output jack, and then connecting the 3 plugs to the communication jacks on each of the fan speed controllers. You can use the standard 12" fan control cables provided with our blower door systems to connect the plugs to the controllers, or you can purchase longer cables at any electronics store (these cables can be stereo or mono).



#### b. Manual Control of Fans

With this method, you start up each fan manually, one at a time. When many fans are being used (leakier buildings) you may be running each fan full speed right away. You essentially get one new pressure level for each fan you turn on. You may choose to adjust one fan speed to fine tune the building envelope pressure.

##### *Advantages*

Fans are typically running at or near full speed. This leads to lower current draw and somewhat better flow precision. Using this method, it is possible to run two fans off of a single 20 Amp circuit if you avoid running both of them at partial speed at the same time. However it is recommended to have each fan on its own circuit.

You do not need to connect fan speed control cables from the DG-700s to the fan controllers.

##### *Disadvantages*

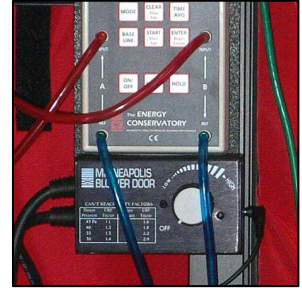
It is harder (or tedious, at least) to hit specific pressure targets.

After the first fan is running, you need to remember to start up additional fans *before* you uncap them, or else the pressure caused by the already-running fan(s) can cause the fan to run in reverse.

Interruptions may be harder to deal with.

## Note: When Using a 2 or 3 Fan Blower Door System

- For the 2 and 3 fan blower door systems, we recommend that all ports on the DG-700 gauges have tubing connected at all times to protect from noisy readings caused by air currents. For example, the gauge pictured to the right is being used to measure flow through from 2 of the fans. When the system is depressurizing the building, the blue tubing connected to the reference ports is simply run off to the side of the blower door system to protect from air currents. When the system is pressurizing the building, the blue tubing will be run to the outside to provide the appropriate reference pressure for the fans.

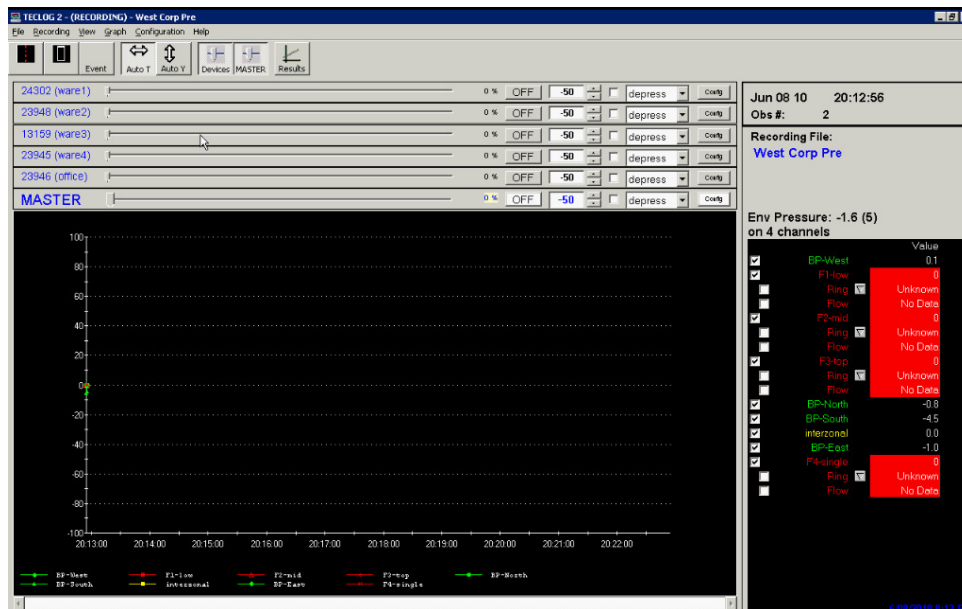


## Step 5: Start Data Recording.

To start data recording, click on the top **Recording....Start Recording** menu item. At this point, TECLOG2 will search through all available COM ports on the computer to try and find the devices with the specific serial numbers entered into the Device Settings screen. If any of your specified devices are not found, recording will not begin and the configuration settings window will appear. If any extra devices are found that you have not specified, then you will be warned and given the option to cancel.

**Note:** If you are having trouble creating a communication link with all of the devices, clicking on the *Scan for Ports/Devices* button in the Configuration Settings screen will provide a listing of all available COM ports on the computer and a list of Energy Conservatory devices that are connected to those COM ports. (The devices must be on to be detected.)

Once a communication link has been established with all the listed devices, you will be prompted to enter a filename for the data that will be recorded. After the filename is entered, the TECLOG2 data recording screen appears.



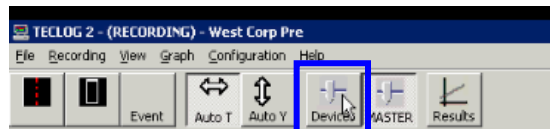
The most prominent feature of the data recording screen is the graph displaying the data as it is acquired. The rate at which data points (or observations) for each active channel are added to the graph is determined by the **Sample Interval** from the Configuration Settings screen (in this example we used the default setting of 1 second averages). The initial width of the x-axis (time) is determined by the **Auto Time Interval**, and the y-axis limits are determined by the **Startup y max** and **Startup y min** settings, all located in the

Configuration Settings screen. A time scroll bar, located at the bottom of the screen, allows the user to scroll back and look at data that has scrolled off the screen. **Note:** After using the time scroll bar, click on the **Auto T** button to reset the x-axis scale and display data currently being acquired.

The right side of the data recording screen shows the current date and time (taken from your computer's internal clock), the observation number for the most recent sample interval, and the channel label and channel values (corresponding to the current observation number) for all active channels (in this case we have 9 active channels). Channels can be temporarily removed from the graph by clicking on the display button to the left of each channel label. Data for all active channels are stored to the data file even if the display button is turned off. For active channels where the Channel Type has been set to a fan flow, the fan configuration (Ring) and the fan flow are also displayed in addition to the fan pressure.

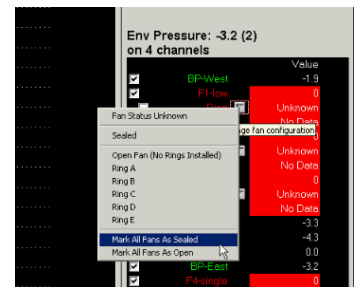
**a. Hiding Device Fan Controls**

At the top of the graph are 6 fan control interfaces (1 for each DG-700 and 1 Master control). Because we will be using the Master Fan Control interface to control all fans we can hide the 5 individual fan controls by clicking on the **Devices** button in the Toolbar menu.



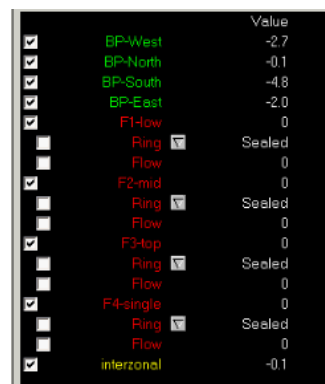
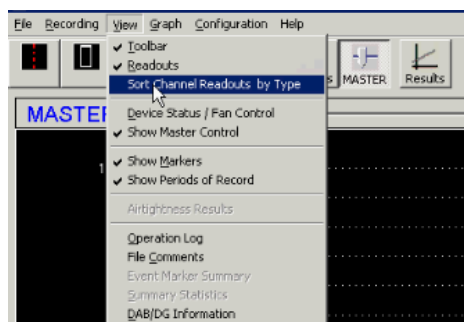
**b. Mark Fans as Sealed**

When data recording begins, you will notice that for all Channel Types that have been set to a fan flow, the fan pressures (and ring settings and flows) in the channel value readouts are flashing red. This is normal and is a reminder to physically seal off the fans and to mark in the software that you have sealed them off. Make sure all of the fans are sealed and then click on any of the ring pull-down menus and select **Mark All Fans as Sealed**.

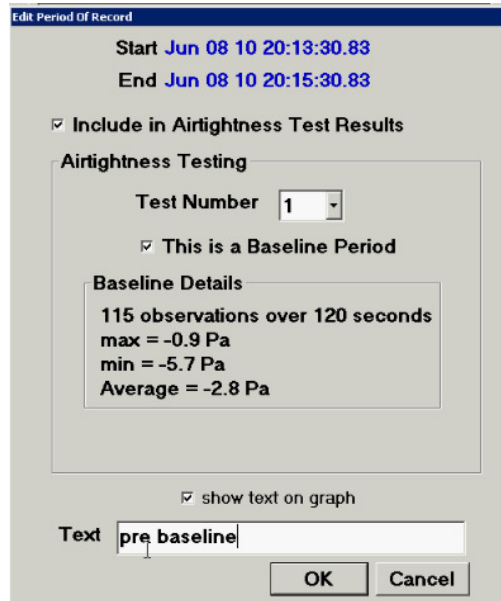


**c. Sort Channel Readouts by Type**

It is often useful to sort the channel readouts on the right side of the screen by Channel Type. This is done by selecting **Sort Channel Readouts by Type** from the **View** menu item. All building envelope channels are listed first, followed by fan flow channels and then standard pressure channels.







Because this region is a baseline period, check the box labeled *This is a Baseline Period*. Also, name the period of record in the *Text* field. Click *OK* and you are done creating your pre-test baseline period of record. **Note:** Be sure the *Include in Airtightness Test Results* box is checked, and that the *Test Number* for this POR is set to Test 1. We will use Test 1 as the depressurization test, and Test 2 as the pressurization test.

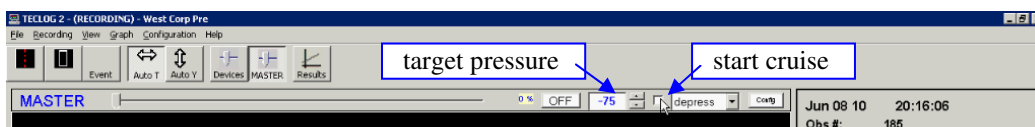
Once a time region has been designated as a POR, the region box turns from white to green. A POR can be edited by first clicking within the region (this causes the region box to turn from green to white), then right-clicking within the box and selecting *Edit Period of Record*.

#### g. Turning on the Fans Using the Master Fan Cruise Control.

The next step is to begin collecting data with fans running and the building depressurized (or pressurized) – we will conduct a depressurization test first and then a pressurization test. First remove the flow rings from all of the fans that will be turned on. We will operate all fans in the open configuration, and then when necessary turn one of the fans off and seal it. Use the smallest number of fans that can reach the target envelope pressure (in this example we need 4 fans to hit our largest target pressure of 75 Pa). Make sure these fans have their speed controllers clicked to the “just on” position, and that the fan speed controllers are connected to one of the DG-700 gauges. **Note:** For a Model 3 fan, the “just-on” position means that the controller knob is turned clockwise from the off position only until you feel the click and no further. If the controller knob is turned up more than the “just on” position, TECLOG2 will not be able to control the fan speed.

Once you have removed all flow rings from the fans, click on any of the ring pull-down menus and select *Mark All Fans as Open*. Initially after marking the fans as open, the fan channel readouts will be flashing red to indicate low fan pressure (this is normal because the fans have not been turned on).

Above the graph you will notice the Master Fan Control interface. Because we will first conduct a depressurization test of the building, be sure the Test Mode is set to *depressurize*. In the target pressure box input your first target envelope pressure (in this case -75 Pa). Then click on the *start cruise* checkbox and cruise control will begin.

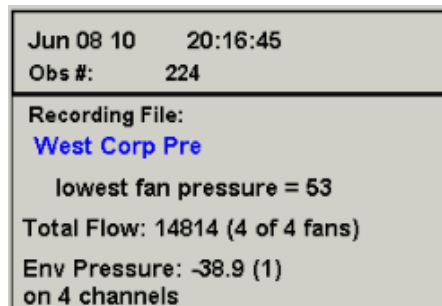


All the fans will now begin speeding up at the same time in order to depressurize the building to -75 Pa. Once the fans turn on high enough to accurately measure flow, the red flashing in the fan channel readouts will go away. **Note:** You can quickly shut down all fans by either clicking on the *Off* button on the Master Fan Control interface, or by simply pressing the *Esc* key on your keyboard.



A key display element is the box in the upper-right corner of the channel readouts. This is where you can see:

- The lowest fan pressure of all of the four unsealed fans (53 Pa). If any of the fan pressures are below the recommended minimum, this line will turn red.
- The total flow rate for the four fans (14,814 CFM)
- The average of all 4 four exterior building envelope pressures (-38.9 Pa). This is the building envelope pressure value that is used by the Master Cruise Control.
- The difference between the highest and lowest of the four building envelope pressures (1 Pa) – this gives you an idea of the uniformity in the 4 building envelope pressure readings.



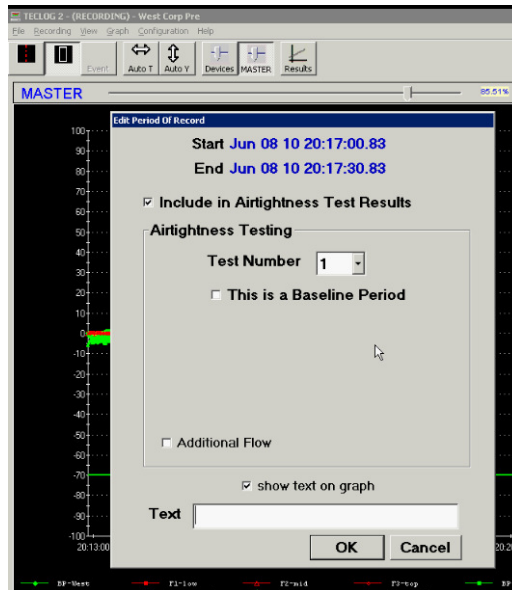
If you need to rescale the y-axis in order to show all of the data displayed on the graph, click on the **Auto Y** button. In addition, if you ever need to rescale the x-axis (time axis) to show the currently collected data, click on **Auto T**.

#### **h. Creating Fan-On POR's for the Depressurization Test.**

Once the Master Cruise Control has maintained the target envelope pressure for a reasonable amount of time (in this example we chose a time period of approximately 30 seconds), click the up/down button next

to the master cruise target pressure box to change to the next target envelope pressure. For the depressurization test, we want to record 12 target pressures starting at -75 Pa and ending at -20 Pa. Therefore we entered -70 Pa as the next target building . **Note:** If you want pressure intervals other than the default of 5 Pa steps, then edit the target pressure value manually.

After you have changed the target envelope pressure, the fans will slowly ramp down to achieve the new target envelope pressure. After the fans are adjusted, you will need to record data for another 30 second period. While waiting for this 30 second period you can go back and create the first Fan-On POR. This is done with the **Region Select Tool** just as you did for the Pre-Test Baseline POR. Create a 30 second POR for the first Fan-On time period. Do **NOT** check the *This is a baseline period* check box in the Edit Period of Record window. Enter text indicating the target envelope pressure (e.g. 75 Pa) and then click **OK**.



#### i. Continue Creating Fan-On POR's - What if you see a red low fan pressure warning?

Continue stepping down through your pressure targets, and creating Fan-On POR's. Keep an eye on your lowest fan pressure. This label will start flashing when any operating fan is below a minimum acceptable fan pressure level. If you see a red low fan pressure warning, follow these steps:

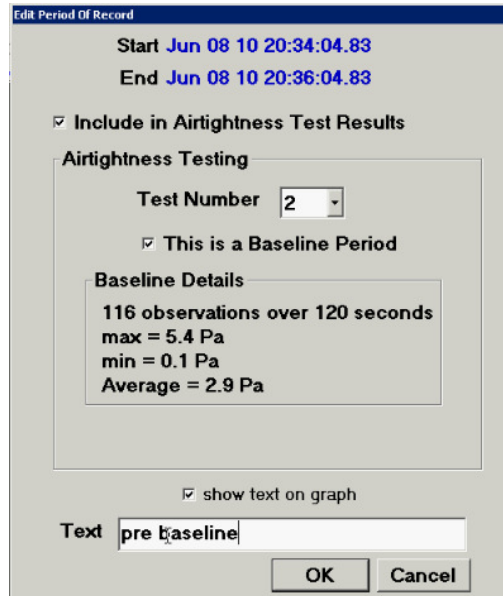
- Turn off all fans by clicking on the **Off** button on the Master Fan Control interface.
- Seal off one the blower door fans and physically turn off the speed controller for the sealed fan.
- In the channel readout for the sealed fan, mark that fan as **Sealed** using the ring pull-down menu.
- If desired, create an Event Marker that indicates you have turned off the fan.
- Be sure the master cruise target pressure box is set to the next target envelope pressure you wish to achieve.
- Click on the **start cruise** checkbox and cruise control will begin again.

#### j. Create a Post-Test Baseline POR for the Depressurization Test

When you have completed all of your Fan-On POR's for the depressurization test, turn off all the fans by clicking on the **Off** button on the Master Fan Control interface. Physically seal off all of the blower door fans, but leave the fan speed controllers in the just on position. In TECLOG2, use one of the channel ring pull-down menus to select **Mark All Fans as Sealed**. After collecting approximately 2 minutes of baseline readings, create a Post-Test Baseline POR (similar to the Pre-Test Baseline POR – be sure to click on **This is a Baseline Period** in the Edit Period of Record window, and be sure the **Test Number** for this POR is set to 1).

### k. Create a Pre-Test Baseline POR for the Pressurization Test

Because we will conduct the pressurization test immediately following completion of the depressurization test, keep all fans sealed and allow TECLOG2 to record an additional 2 minutes of baseline readings. Now create the pre-test baseline POR for the pressurization test. Be sure the **Test Number** for this POR and all subsequent POR's for the pressurization test have the **Test Number** set to 2.

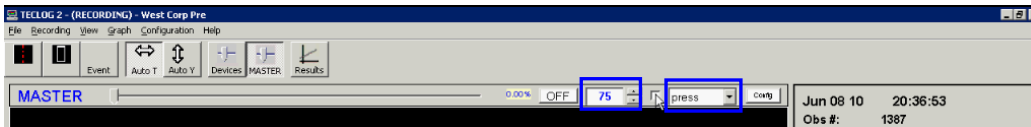


### l. Set-up the Blower Door Fans and Gauge Tubing Connection for a Pressurization Test

We now need to physically turn the blower door fans around in the nylon panels so that they will be pressurizing the building. In addition, be sure the reference pressure ports on all DG-700 channels being used to measure fan flow are now being referenced to the outside space near where the fans are installed. All flow rings can be removed from the fans when turning them around. **Note:** If you have an older Model 3 blower Door fan with a fan direction switch, you may not use the direction switch in lieu of turning the blower door fans around. Air must be blowing into the building through the metal exhaust guard on the fan when pressurization testing.

### m. Set the Master Cruise Control for a Pressurization Test

On the Master Fan Control interface change the Test Mode to **pressurize**. Also input the first target envelope pressure for the pressurization test (in this case 75 Pa). Click on the **start cruise** checkbox and cruise control will begin.



### n. Create Fan-On POR's for the Pressurization Test

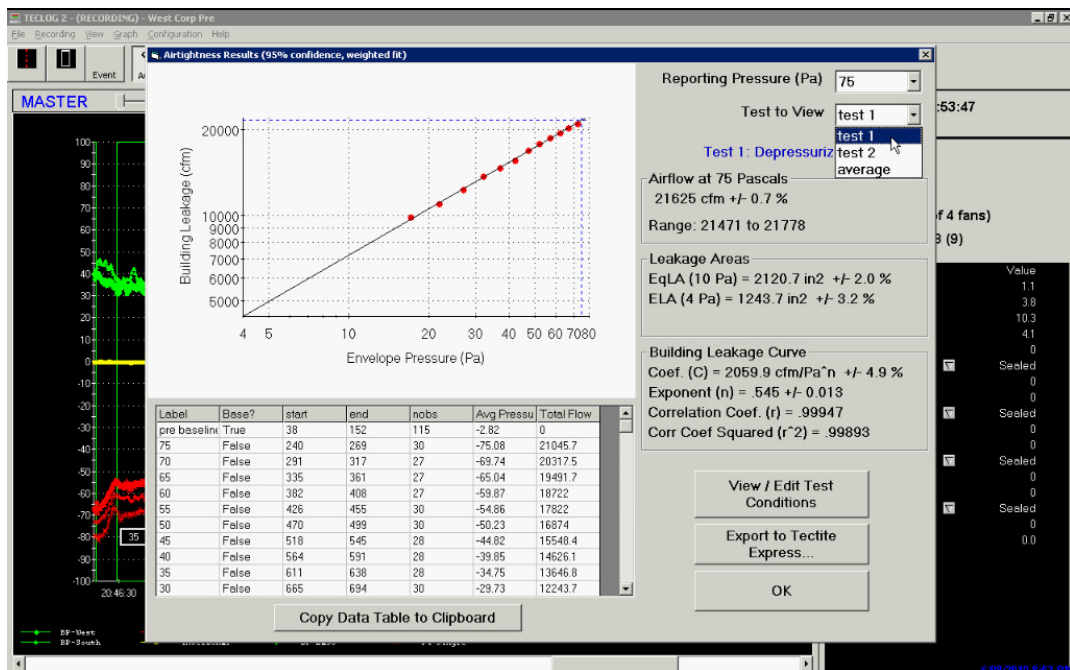
Just like the depressurization test, allow TECLOG2 to collect data at each of the target pressures (we recorded data at 12 target pressures ranging from 75 to 20 Pa), and then create the Fan-On POR's.

**o. Create a Post-Test Baseline POR for the Pressurization Test**

When you have completed all of your Fan-On POR's for the pressurization test, turn off all the fans by clicking on the *Off* button on the Master Fan Control interface, and then manually turn off the speed controllers. Physically seal off all of the Blower Door fans. In TECLOG2, use one of the channel ring pull-down menus to select *Mark All Fans as Sealed*. After collecting approximately 2 minutes of baseline readings, create a Post-Test Baseline POR (similar to the Pre-Test Baseline POR – be sure to click on *This is a Baseline Period* in the Edit Period of Record window, and be sure the *Test Number* for this POR is set to 2).

**Step 6: Viewing the Results.**

While the data file is displayed on the graph, you can view your airtightness test results by clicking on the **Results** button in the toolbar.



**a. Airtightness Results Window.**

There are several things to notice about the airtightness results window. First, in the **Test to View** field (upper right hand corner) you can choose to see the results of Test 1, Test 2 or the Average of both Test 1 and Test 2. Secondly, a pull-down menu in the upper right hand corner can be used to select the reporting building envelope pressure in Pa. Third, the airflow is reported at the selected reporting pressure along with its 95% precision confidence interval, expressed as a +/- percentage (in this case 0.7) and also as low to high limits (21,471 to 21,778). Below the airflow results are the fitted parameters, also with 95% confidence interval information and the correlation coefficient (r) and its square, commonly referred to as the R-Squared.

**b. Density and Viscosity Corrections.**

If you need to perform density and/or viscosity corrections (for example, per ASTM - E779), click on **View/Edit Test Conditions** for the selected test and enter the required information. In this example all readings were indoors at 68 F and the building elevation was 1000 feet above sea level.

Edit Environmental Parameters (Test 1)

ASTM E779 Temperature and Altitude Entry

Temperature and Altitude Values Must Be Entered

	Pre-Test	Post-Test
Indoor Temperature (F)	68	68
Outdoor Temperature (F)	68	68
Altitude (ft)	1000	

OK

### c. Export Options.

There are two ways to export the summarized airtightness test data.

**Copy Data Table to Clipboard** will place on the Windows clipboard a copy of the selected results, with one row for each period of record plus a header row. This is in a format that can be easily pasted into a spreadsheet or other program for analysis or into an email.

**Export to TECTITE Express** will store the selected results in a file which can be loaded by TECTITE Express 4.0 or newer.

### d. Ending the Recording.

Once the testing is completed, you can end the recording session using the **Recording....Stop Recording** menu item. TECLOG2 will ask: *Would you like to load the file you just created?* Answer *Yes* to load the file. **Note:** Stored data files can also be loaded using the **File....Load Data File** menu item.