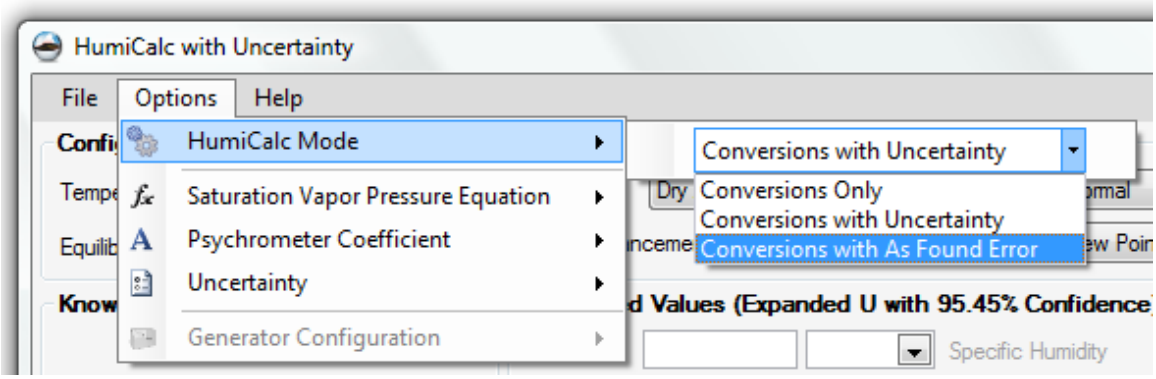
How to Calculate “As Found” Error using HumiCalc® with Uncertainty

TWO PRESSURE GENERATOR AS FOUND ERROR

This example will perform an “As Found” calculation for a Two-Pressure type generator to see what the effect the pressure and temperature error have on the generated humidity. This is a common question after a calibration of a Two-Pressure type generator, since it is not obvious what influence the different pressure and temperature errors have on the generated humidity. This example will use HumiCalc with Uncertainty’s “record” capability so that we can log the calculations over each pressure calibration point within each temperature calibration point.

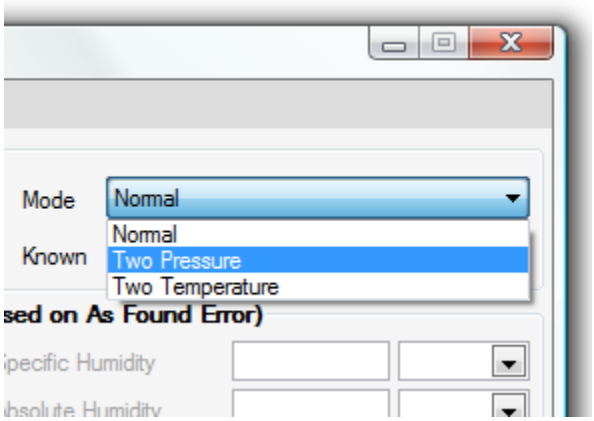
SET THE HUMICALC MODE TO “CONVERSION WITH AS FOUND ERROR”

- Under the “Options” menu select “HumiCalc Mode” and select “Conversions with As Found Error” from the drop down.



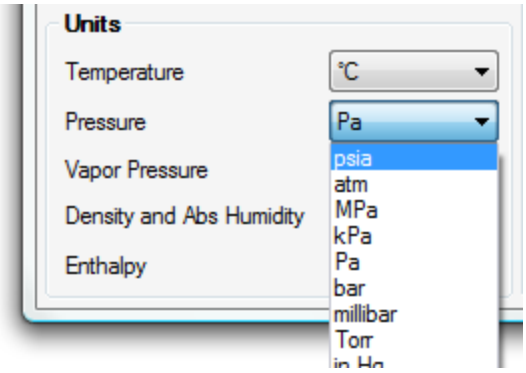
SET THE MODE TO “TWO PRESSURE” or “TWO TEMPERATURE”

- Configure the application to use either “Two Pressure” or “Two Temperature” Mode using the Mode drop down.



SELECT THE DESIRED UNITS

- Select the desired temperature and pressure units.

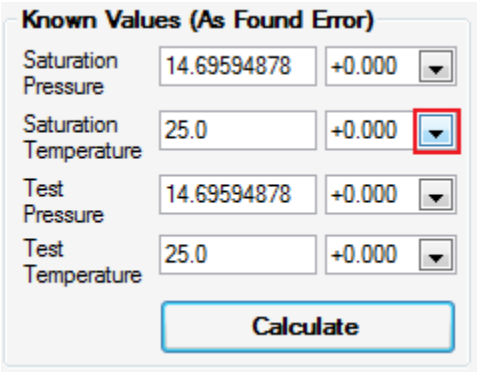


AS FOUND ERROR

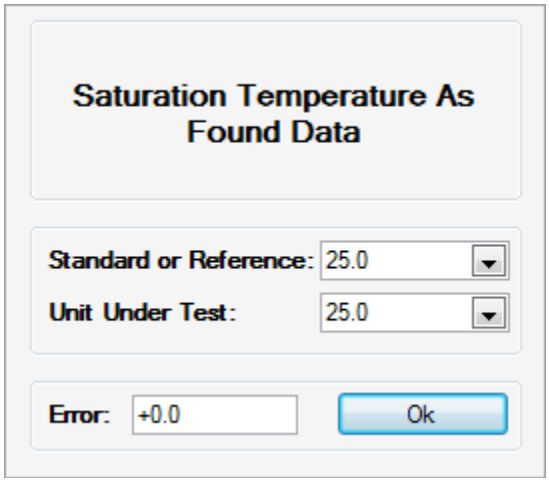
- The "as found error" can be either directly entered into the error field for each known item or through the use of the drop down form. Here we will demonstrate the use of the drop down form to enter the as found results from a calibration.

> *Note: The user can directly enter the error on the main form, but can not on the drop down form. The drop down form is designed to calculate the error based on an entered standard or reference value and the entered unit under test value. HumiCalc will calculate the error as the amount the unit under test is from the standard or reference (Error = UUT - Standard).*

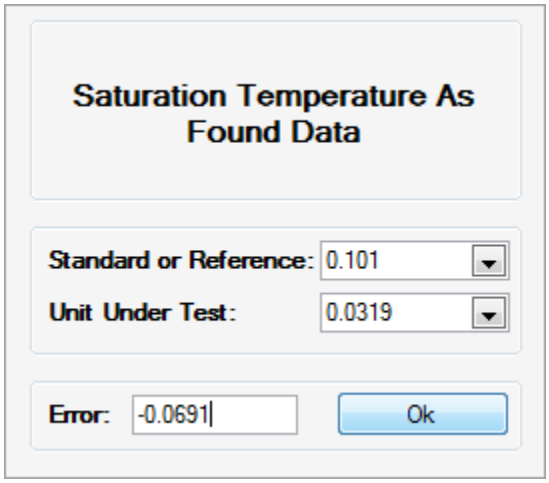
- Click the drop down arrow for the Saturation Temperature



- This opens the as found drop down form for this item. We can see that the error is zero because the standard and unit under test have the same value.

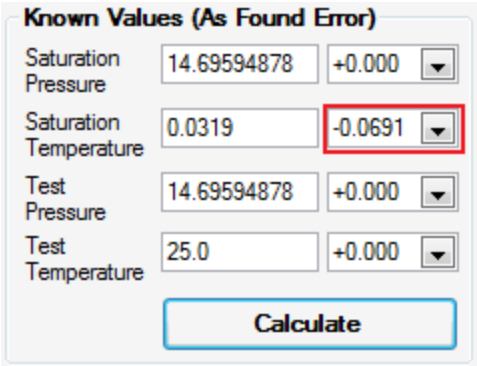


- Now we will enter the standard or reference value from the calibration as well as the Unit under Test value. Notice the Error value is automatically calculated.

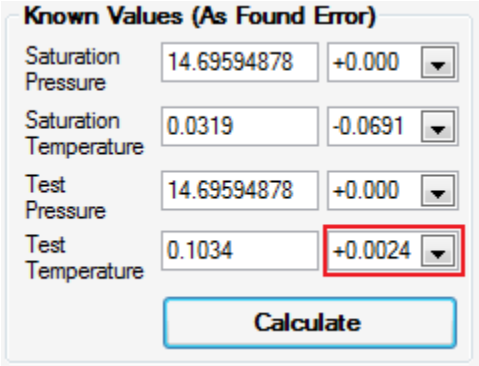


- Click the Ok button

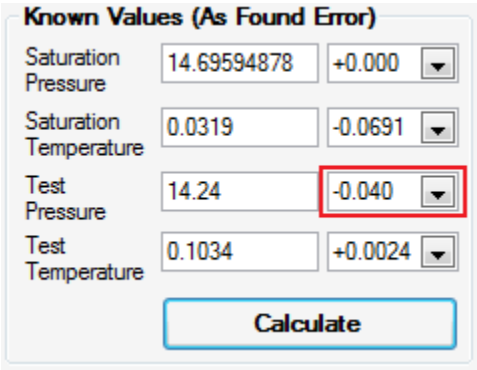
- We now see the Saturation Temperature error that we just entered.



- Now repeat the same operation for the Test Temperature (Chamber Temperature)



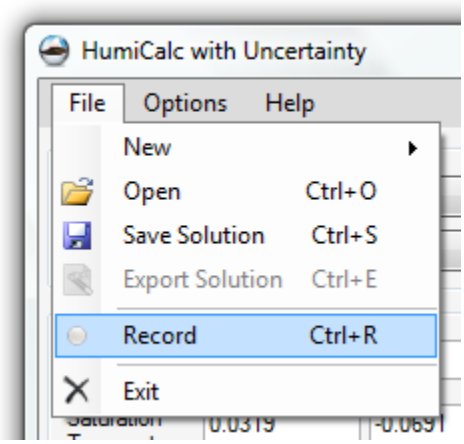
- Enter the Test Pressure using the lowest pressure calibration point used during the calibration. If this is a 2500 generator you would enter the lowest pressure calibration point for the low range pressure transducer.



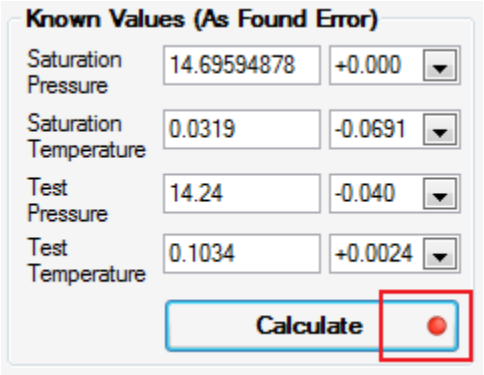
- Next we will begin recording the calculation so that we can plot the results using our favorite spreadsheet or word processing applications.

RECORD

- Enable recording by selecting “Record” under the “File” menu.

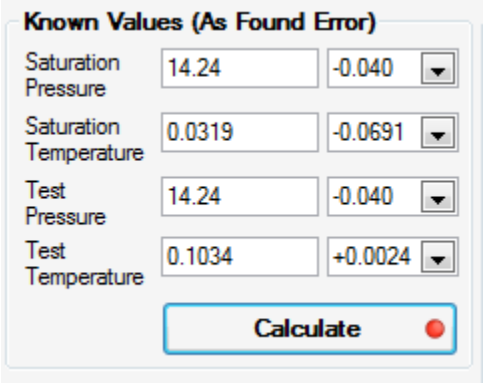


- We can very that HumiCalc is recording by the red indication light on the “Calculate” button.

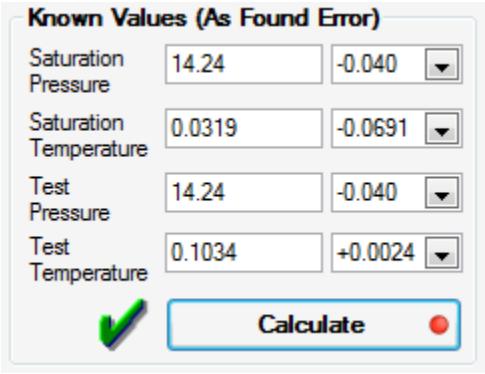


- Next we will perform calculations on each of the pressure calibration points. On a 2500 this will be the three low range pressure points and the three high range pressure points.

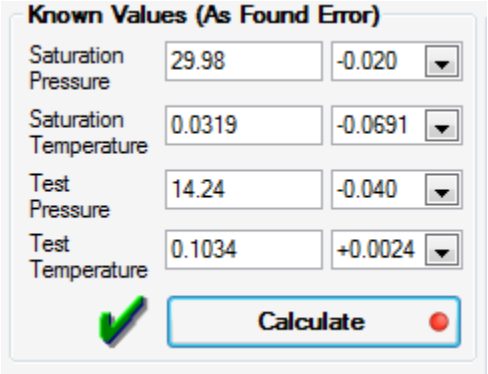
- Enter the first pressure calibration point. Note this is the same value that we entered for the Test Pressure.



- Press the calculate button.

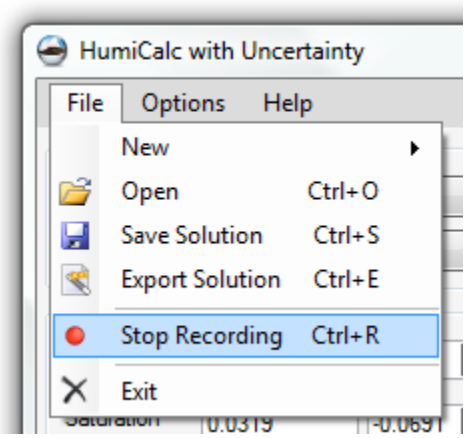


- Enter the next pressure point and press the calculate button

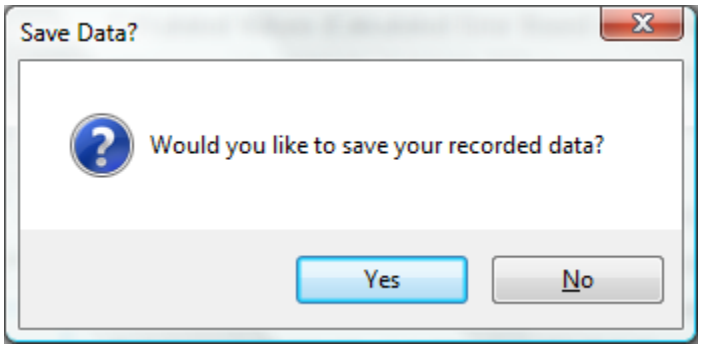


- Repeat this process for all the remanding pressure calibration points.

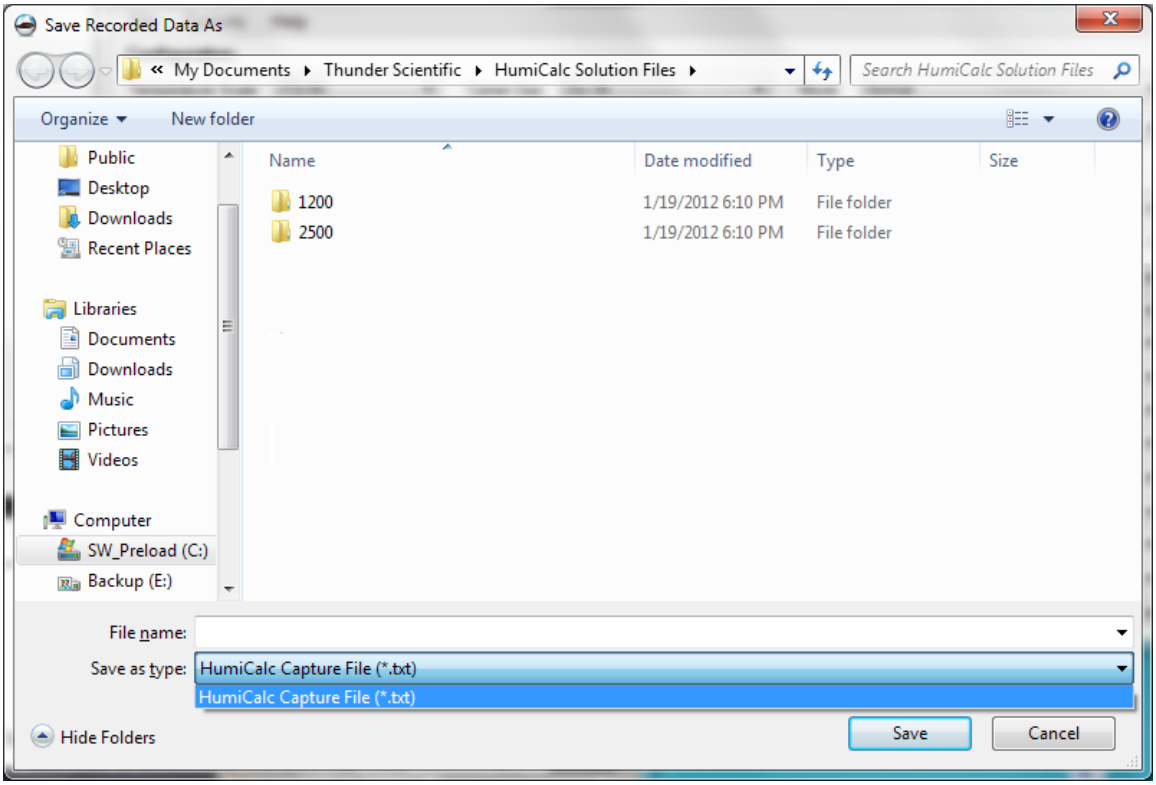
- Once completed, stop recording by selecting “Stop Recording” under the “File” menu.



- Select “Yes” when prompted to save the recorded data.



- Select the “HumiCalc Capture File (*.txt) save as type and give the file a name.

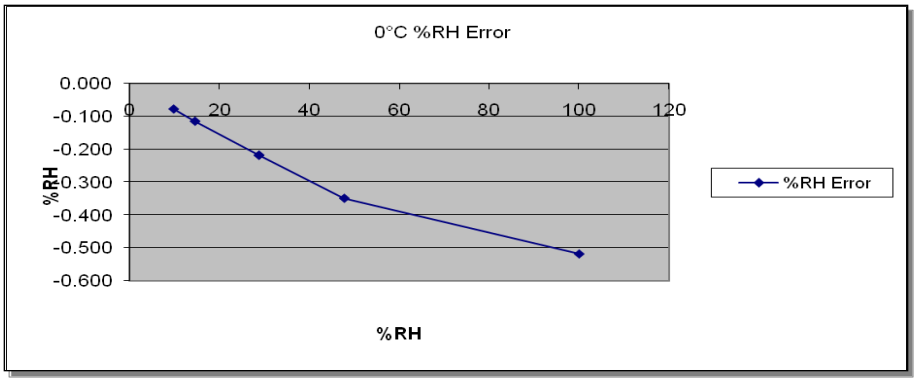


ANALYZE

- HumiCalc stores the data in a tab delimited format that can be easily imported into most spreadsheet or word processing applications. The data is arranged in columns with each calculation composing of the rows. In this example we are interested in the %RH and %RH Error.

	A	B	C	D	E	F	G	H	I	J	K
1	Known and Calculated Values (As Found Error):										
2	Saturatior	(Saturatio	Saturatior	(Saturatio	Test Press	(Test Pres	Test Temp	(Test Tem	%RH	(%RH Error)	Frost F
3	14.24	-0.04	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	99.48215836	-0.517841644	
4	29.98	-0.02	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	47.43105218	-0.348603046	-8.67
5	49.98	-0.02	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	28.58778599	-0.217706227	-14.
6	49.98	-0.02	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	28.58778599	-0.217706227	-14.
7	99.99	-0.01	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	14.46195127	-0.114358158	-21.5
8	149.99	-0.01	0.0319	-0.0691	14.24	-0.04	0.1034	0.0024	9.757233823	-0.077406957	-25.5
9											

- This data can then be easily plotted to give an overall picture of the “As Found” error for this temperature point.



- The same steps are then repeated for the rest of the temperature calibration points.