The purpose of this document is to document information on building a Stanley Meyers Water Cell. My plan is to build a test cell that I can use to continue testing technology. To date I have been focused on the electronics as the coils and capacitor have multiple variables that have complex interactions. I will be using information from other threads in the forum.

I will be showing material I will be using and tools that I use to make the cell.

Here is what Don measured when for items in Stan's Estate:

Delrin encased tubes with various water types

	Unit	Empty	Tap Water	Distilled Water	Rain Water	Series (10 tubes)
R @ 100Hz	Ohms					
R @ 120Hz	Ohms					
R @ 1kHz	Ohms					
R@ 10kHz	Ohms					
L @ 100Hz	H					
L @ 120Hz	H					
L @ 1kHz	H					
L @ 10kHz	H					
C @ 100Hz	F	22pF	24.85uF	670nF	655nF	2.52uF
C @ 120Hz	F	21pF	23uF	600nF	505nF	2.29uF
C @ 1kHz	F	21.6pF	5.72uF	25nF	21nF	446.6nF
C @ 10kHz	F	21.58pF	288.5nF	N/A	N/A	N/A

One thing that I found confusing about this table is that values for the first four columns are for a single cell and while the last column is labeled 10 tubes in series it did not specify what was in the tubes. However, if you do the series calculation it appears to be for Tap Water.

Ronnie in his post on the forum said the number 10 was important. If you do the calculation for 10 capacitors in series the results is the value for one cell divided by 10 i.e., 22pf for each cell become 2.2pf for 10 cells in series.

The are calculators on the internet that you can use to calculate capacitance for capacitors in series and parallel. I will use those to figure out the size of tubes in the fuel cell

There are also calculators o the internet that you can use to estimate the capacitance of a cylinder capacitor.

In doing the calculations for my coil and impedance balance I followed Ronnies calculations in the forum for 10 cells. For most of testing I have been using a 2.2pF capacitor as I was not ready to build a fuel cell my initial goal was to understand the electronic of the system. So far, I have built and tested 2 versions:

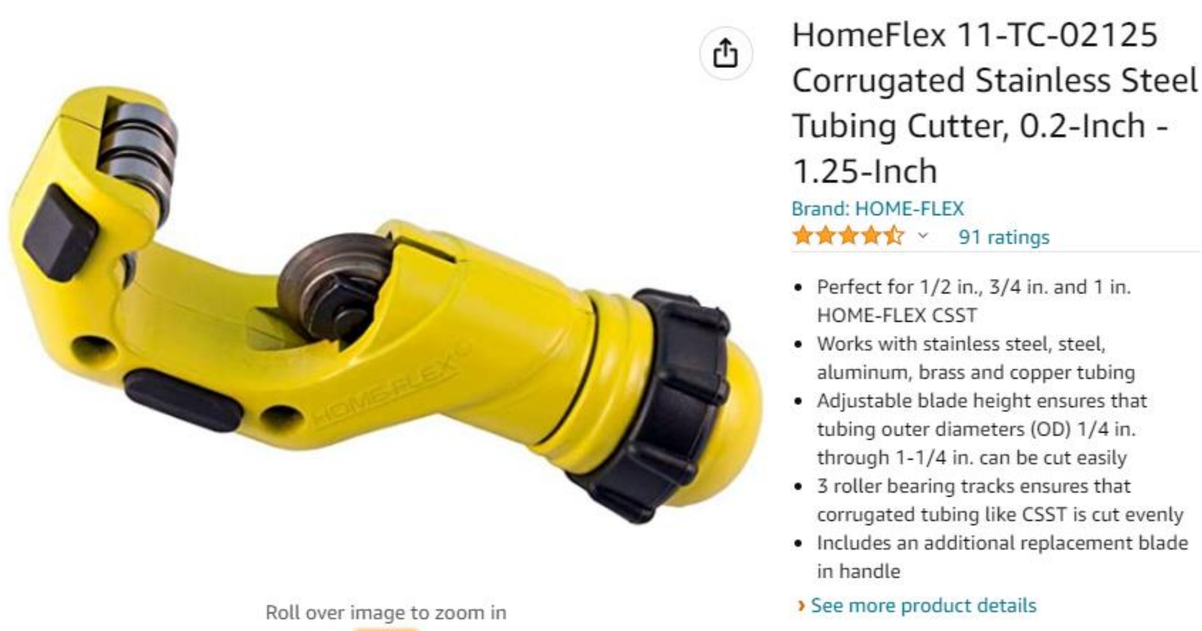
1. First, I built circuits as bread boards from the schematics for each function. I initially built circuit on pug-in bread board. After testing I transferred wiring and components to soldered version of board with the exact same layout. Connect between boards was point-to-point wiring.

2. Second, I built the PCB boards that Daniel ----------- created. These boards included all the circuits from the original system in several case with multiple circuits on the same boards. Daniel also provided a back plain to mount the boards which and several boards for other circuits that I had originally built. It should be noted that Daniel boards did include a few modifications to the original circuit that documented in the original schematics. The main difference is on the Main VIC board where circuit was modified to provide the high frequency digital signal on both sides of the coil.
   Note 1: In first system I did not build the Digital Means board as I did not think I needed it as the frequency generator board generated a test frequency which I could vary. However, it does not allow you to generator a variable pulse width signal which allows to vary the voltage to the coil. While the gate card does allow you change pulse width it does not feed the analog generator where the voltage level is generated so you need the Digital Means Card.

   Note 2: Analysis of original schematics and test results of both systems have been posted in the forum.

Tools and Test Equipment

Cut stainless steel pipe with $40.00 from Amazon



LC-100A Meter

Using this meter to check capacitance of tubes.

I purchased 6' of both ½" and 3/8" 304 stainless steel pipe from Granger wall thickness both is 0.035mm.

I was able to cut but with the cutter above with no problem. I did have to clean up the inside of the cuts as the cutter left a sight ridge on inside of cut. This is normal when using a pipe cutter of this type. Note: The cutter above leave a very small ridge and the extra rollers kept the pipe from getting compressed.

I do have a pipe reamer that I tried to use to remove the ridge but did not work as well as I would like. What did work was using two small files one round file and one with flat on one side and taper round on other side. The picture below shows show the 2 tubes with cap installed and the tools I used to clean up cuts.

Tube with cap.jpg

I tried to use cap from the forum, but it had a loose fit on the ½" pipe. I did try rescaling it to fit ½" pipe and that worked but then center piece was to0 small, so I built a new one using Tinkercad and printed on my Ender 3 V2 printer. It took a couple of tries to get the dimensions correct but it was also the first time I was using Tinkercad. I used the same files and knife to clean up cap as I printed using a brim.

Measurements I used for making Cap

Bottom ring and top pieces 3mm

Width of ring 18mm

Total height is 8mm

Post to fit hole in 3/8" tube is 7.66mm to get a tight fit

Hole for 1/2" is 13mm (Note: ½" tube measure 12.66mm but that printed too small)

Used Tinkercad to make cap

Measurements I used for making Cap

Width of ring 18mm

Total height is 6mm

Hole for 1/2" is 13mm

Hole for 3/8" is 10mm

Test setup to check capacitance of tubes.

I made a spacer ring that fits over the bottom of tubes to center the 3/8" tube inside the 1/2" tube so I could get a more accurate reading of the capacitance of the cell.

Note: I made spacer so I could do these tests and to obtain size of holes in base I need use when I print the base.

The meter I am using needs to be re-zeroed before each measure which requires leads to be disconnected. I also found when I did some initial tests with shims that holding leads affects reading which is why I used rubber band to hold lead to outer tube. I also noticed that the reading were different when I reversed leads but found difference to be much less using the rubber band. The red lead is positive and black lead is negative.

I did repeat the test several times and similar results.

Readings never completely settle down, but variance is only a few tenths of a pf.

Picture shows items being used

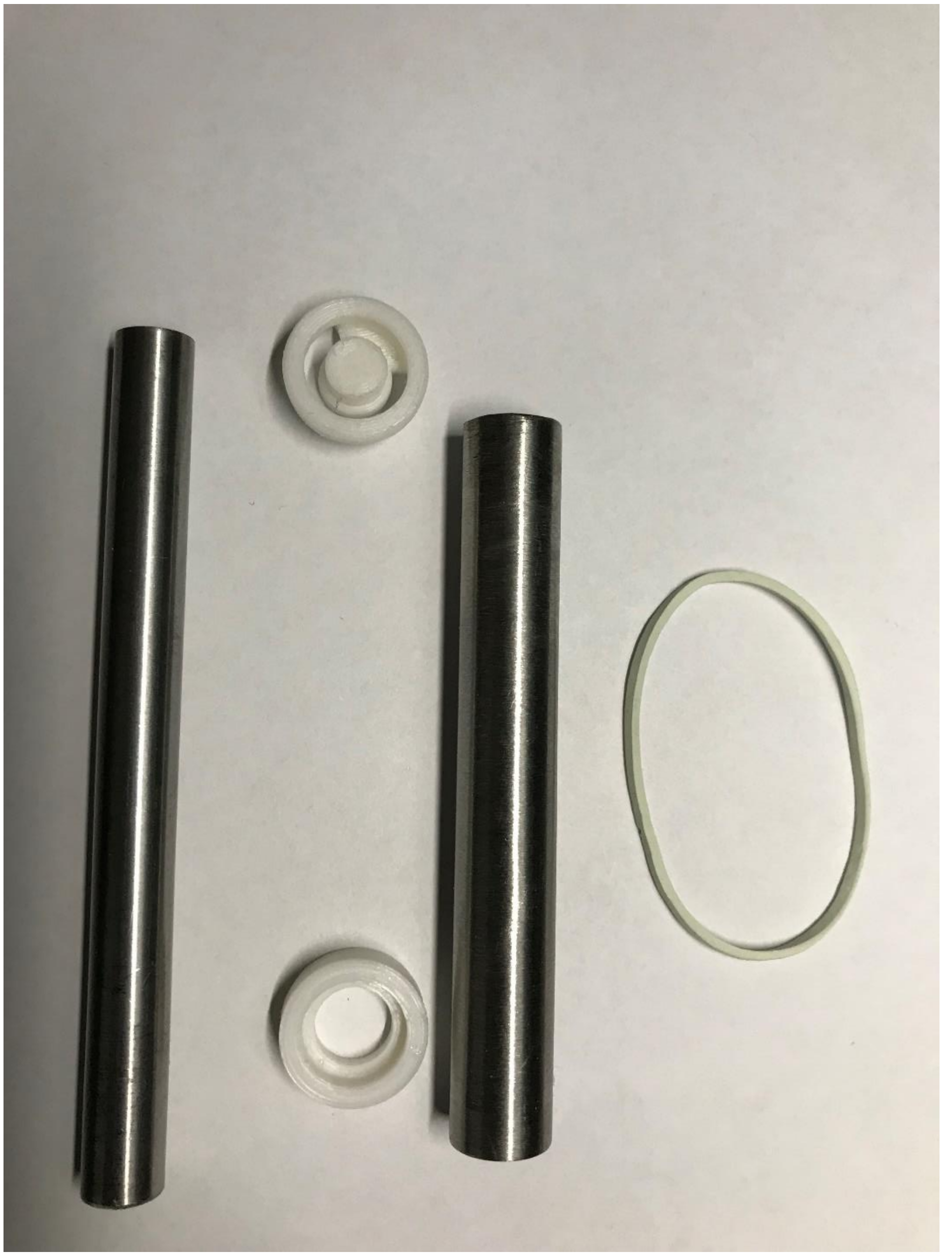
1/2" tube 3 ½" long

Top cap

Bottom spacer

3/8” tube 4” long

Rubber band to hold meter lead on outer tube



Picture shows meter reading and test setup with positive lead of meter on inner tube

Picture shows meter reading and test setup with negative lead of meter on inner tube


MEASURE Cx
31.47pF
Func

Test of 6 sets of tubes outer 1/2" x 3 ½" inner 3/8" x 4" using capacitance meter above

	Outer Pos Lead		Out Neg Lead	
	Cap in pF	Freq in Hz	Cap in pF	Freq in HZ
1.	31.75 - 31.80	667140	29.76 – 29.80	667680
2.	31.95 - 32.01	666750	29.83 – 29.93	667444
3.	31.32 - 31.47	667160	29.71 – 29.74	667840
4.	31.95 - 32.03	667108	30.20 – 30.33	667550
5.	31.51 – 31.63	667310	30.25 – 30.33	667735
6.	31.96 – 32.07	667007	30.43 – 30.57	667512

This one is with bottom spacer on both ends so inner tube sticks out both ends. I wanted to see if this could be used to tune system.

7.	32.86 – 33.11	667540	31.19 – 31.31	667840

I also cut a set from same pipes that are 8-1/2" outer and 9" inner and did same measurements

8.	78.45 – 78.87		72.57 – 72.68	

Test print of tube holder and hole template from V7 STL files from forum. See picture below which has both 4" and 9" tube sets. The single tube is with a new base that I created as both tubes were too loose in the large base. One I got a good fit with this holder I then took the original holder STL file and cut out one tube so I could do some experiments to determine how to scale the original holder STL to give a tight fit for the tubes. I measured tube and tube hole in 3D printed holder and divide tube size by existing hole size printed. I got around 97.7% so I decided to use scale of 98% in first test so it would not be too tight. I then printed the single tube holder from STL I had cut out. That turned out to be a very good fit for both tubes. Next step will be to reprint the whole base using the 98% scaling when I do another print.

However, before I do that print, I plan on doing a few test cutting threads in base I already printed for ¼" bolt so see if I need to change print settings for bolt holes.

Found you must be careful to keep tap straight, and that plastic is soft and so it difficult to keep correct pressure on tap, so threads are clean. To help with I used a ¼" piece of plexiglass with holes drill and tapped to match the holes in base. As the plexiglass is harder, I got a niece clean thread in it. I then held the plexiglass up to the base and used it as a glide to tap holes in base. This gave a much cleaner thread in the base. Tapping the holes in the acrylic tube first then tapping hole in base should have the same effect and should also help with getting threads in the base cross threaded.

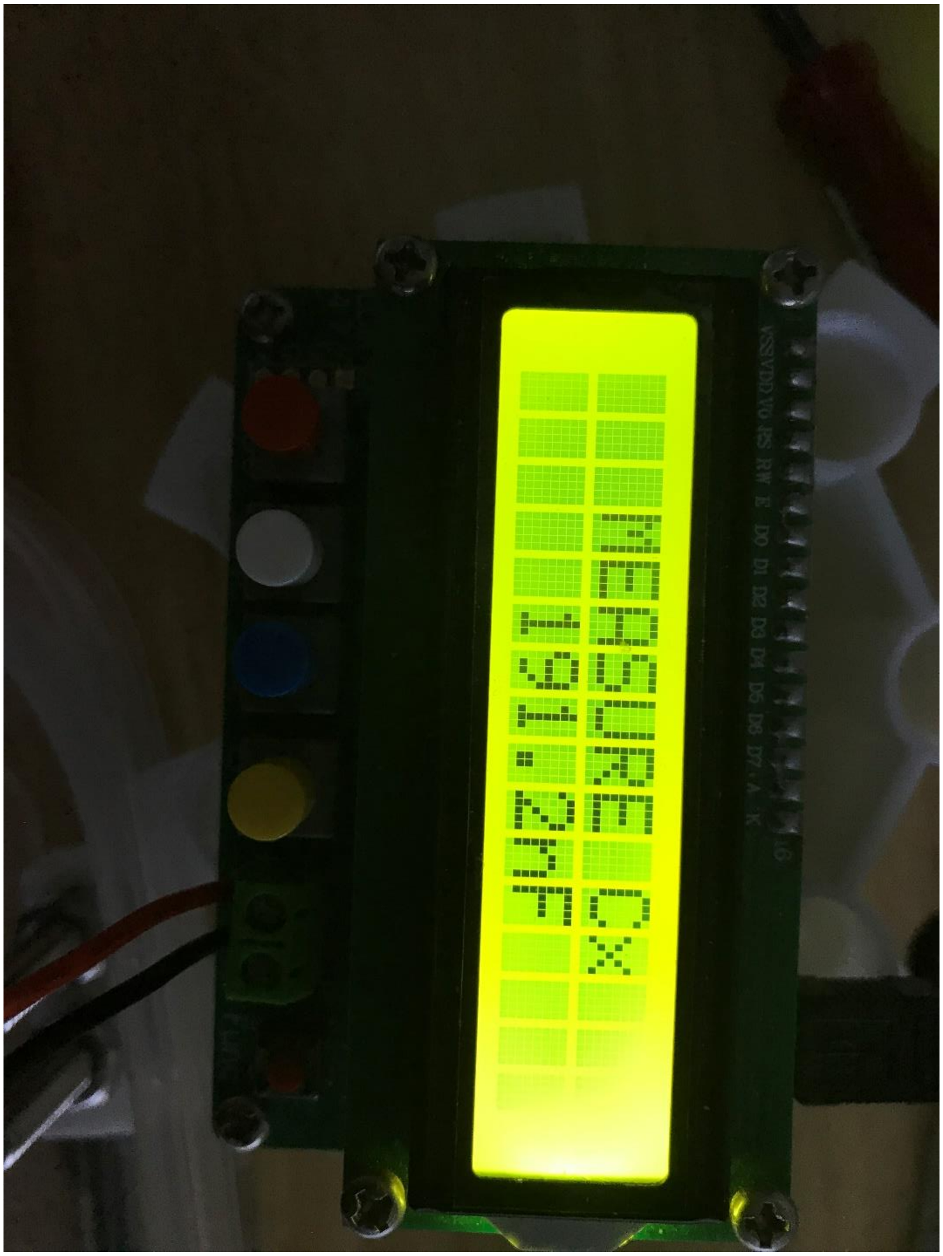
Purchase Stainless steel springs from Amazon they had 2 brands of same size I bought 2 packs of Liberty, 0.5mmx3mmx10mm stainless springs Silver Tone 10pcs only because they came the next day.

These springs fit 4.3mm into the hex head of the stainless-steel set screw I have purchased so I do not need to drill a hole in the set screw. I will just use a lock know for the base at the outside of the tube.

Decided to drill 3mm hole for springs in end of screws. There was already a slight hole, so it was easy to align drill bit. I put lock nut on screw and clamped in in vise on my drill press. I used lock nut base setting on vise to square up the screw. Drilling hole was easier than I expected. By doing this I do not have to cut a slot on end of screw which I was going to do when I was using hex hole to hold spring.

Pictures hole drilling setup

Capacitance measurement setup



Using stainless steel screw and stainless steel 3mm x 5mm spring in 3mm hole. I also shook tube to get air out before doing the test. Plan is to do it with city tap water then repeat with distilled water.

I zeroed meter then let is settle (Note: reading continue to slowly grow.)

NOTE: I recently purchase and new Flute 115 meter that has capacitance setting I got a much higher reading not sure I trust it for this setup. Though it reads caps properly. Others had reported similar issues and recommended meter I am using.

5.5”	In tap water	in distilled water	in air
Tube 1	147.7nF	1905pF	35.22pF
Tube 2	146.4nF	1955pF	33.01pF

Tube 3	131.8nF	1471pF	32.15pF
Tube 4	130.2nF	1673pF	32.62pF
Tube 5	137.1nF	1899pF	32.72pF
Tube 6	169.8nF	2722pF	32.55pF
8.5” Tube		86.25nF	78.12pF

Notes: Not sure I was able to get all the air out of tube during water measurements. The depth of screw was set by lock nuts, so it was the same for all measurements. Bolt was finger tie. This is the same configuration I plan to use on full test cell as I will not have to solder to screws together. Capacitance meter was reset before each reading recommend doing this in manual.

Note: Meter never really stops advancing but change does slow down. So, I let set for about 5 minutes before taking reading.

TESTS ON LONGER TUBE

I wanted to see how length of tube effected capacitance of I using the 8.5” outer tube and the 9” inner tube and doing taking some more reading. As I did not want to cut multiple lengths, I decided to slide the inner tube into the outer tube.

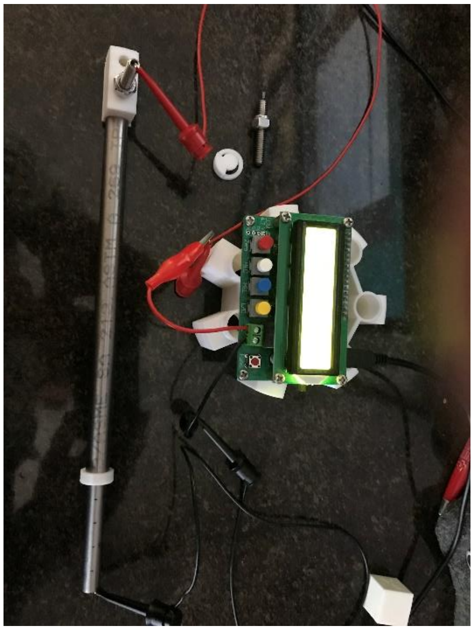
To do this test I make what I call a slider spacer which fits on end of inner tube and has fins that center inner tube inside outer tube. I already had a spacer for the outside end I had made from earlier tests.

Note: When doing this I found that tube still had a sight ring from using pipe cutter on each end. I used pipe reamer to remove did not do good enough job initially.

Items used during testing

Test setup

Note: End cap and second connector screw with spring used for fully inserted inner tube.



Length inserted	in distilled water	in air
5.0”		46.45pF
5.5”	10.16nF	50.06pF
6.0”	11.94nF	55.45pF
6.5”	13.68nF	61.19pF
7.0”	15.27nF	65.02pF
7.5”	17.84nF	69.62pF
8.0”	18.82nF	72.21pF
8.5”	20.68nF	76.23pF
9.0”		77.82pF

As expect this acts as a variable capacitor value changes approximately 4pF ever 1/2 inch or air.

Note: The 9” should be the same as the 8.5” as inner tube is now sticking out the bottom.

Note: Meter was reset before for each reading as recommended in manual.

Note: Need to take care as putting hand close to test setup raise reading.

Cell parts

1- 12” acrylic tube 4” ID 4.5” OD from McMasters (Note: They have 2 versions of this tube this one and on that has 4” ID and 4.25” OD. I choose the large as it fits standard DWV fittings)
2- 4” DWV end connector one for each end slip connector with other end threaded (2) fits standard DWV pipe which has OD of 4 1/2”
3- Flat screw cap for bottom has slot to tighten
4- Screw cap for top has raised square nut to tighten
5- 3D printed holder for seven I/2” tubes
6- 1.5”x ¼” x 20 stainless hex set screw, End of screw drilled with 3mm hole to hold spring
7- 10mm x 3mm stainless spring
8- ¼” x 20 Stainless steel lock nut

When getting ready to add the document to this tread I took another look at this table

Delrin encased tubes with various water types

	Unit	Empty	Tap Water	Distilled Water	Rain Water	Series (10 tubes)
R @ 100Hz	Ohms					
R @ 120Hz	Ohms					
R @ 1kHz	Ohms					
R@ 10kHz	Ohms					
L @ 100Hz	H					
L @ 120Hz	H					
L @ 1kHz	H					
L @ 10kHz	H					
C @ 100Hz	F	22pF	24.85uF	670nF	655nF	2.52uF
C @ 120Hz	F	21pF	23uF	600nF	505nF	2.29uF
C @ 1kHz	F	21.6pF	5.72uF	25nF	21nF	446.6nF
C @ 10kHz	F	21.58pF	288.5nF	N/A	N/A	N/A

After taking the capacitance reading above, I was back to the same question I had a when I first studied this table a long time ago. How where readings taken at specific frequencies as meter I use selects a frequency. I did so more reading and found several articles on how to do that using a signal generator to set frequency and power level. Part of reason I had avoided building cell as I did not and still do have a signal generator.