Hercules Sizing Tester: RS232 Capture Procedure

This document will go through the process of capturing data from a Hercules Sizing Tester's RS232 port to a personal computer (with an RS232 port installed, or a USB to RS232 adapter). It will discuss the file types, program settings, and TAF, Inc. specific methods for producing high quality reports for internal and external use.

The documents used and produced include:

- Excel Spreadsheet Template
  - Placeholder data, for pasting in test-obtained values
  - Pre-rendered graphs at various zoom levels
- TXT and CSV data gathered from serial capture program of choice (RealTerm)

Be sure to note the following:

- Extend RS232 cables as needed with an RS232 extension cable (not a null modem cable, not a crossover cable, no jumpers in the RS232 connectors, etc.)
- The RS232 extension cable may be any length up to 50 feet long
- Pour ink a few seconds *after*, not simultaneously with, the Hercules Sizing Tester *TEST* timer, so the ink pour effect can be graphed. This may differ from the typical operating procedure of running sizing tests, but provides valuable data

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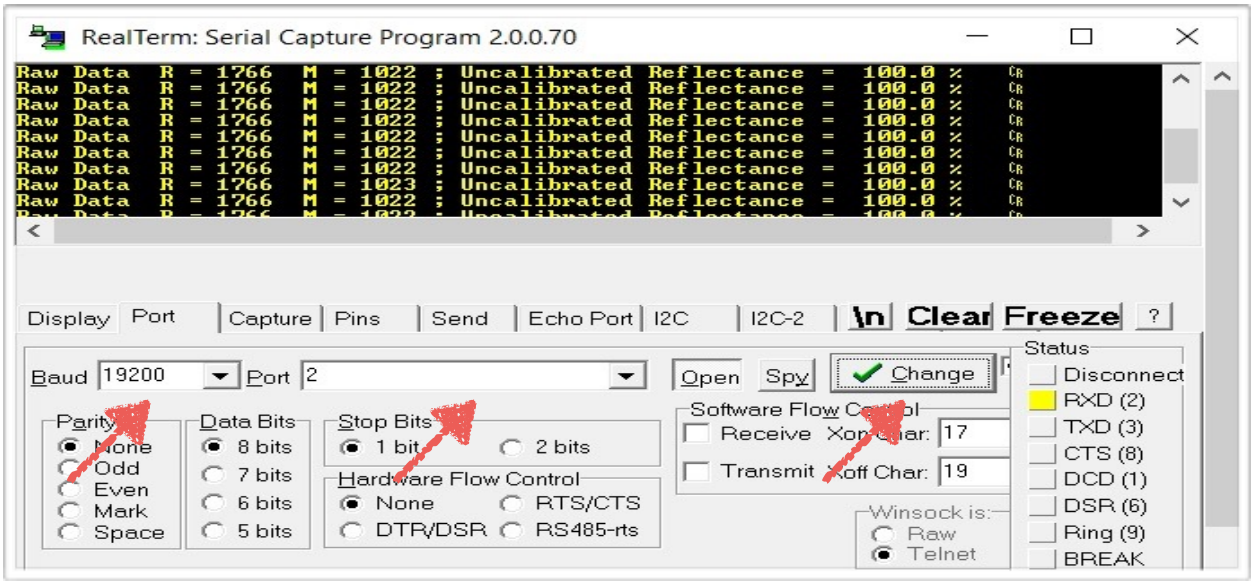
RS232 Capture Preparation

When beginning a new sizing test, the Hercules Sizing Tester (HST) and the computer need to be able to communicate on a channel with the same parameters and correctly specified criteria. This section will go over the TAF, Inc. specified terminal capturing program, its settings and initial set up steps.

Step 1: Verifying Data Output from HST



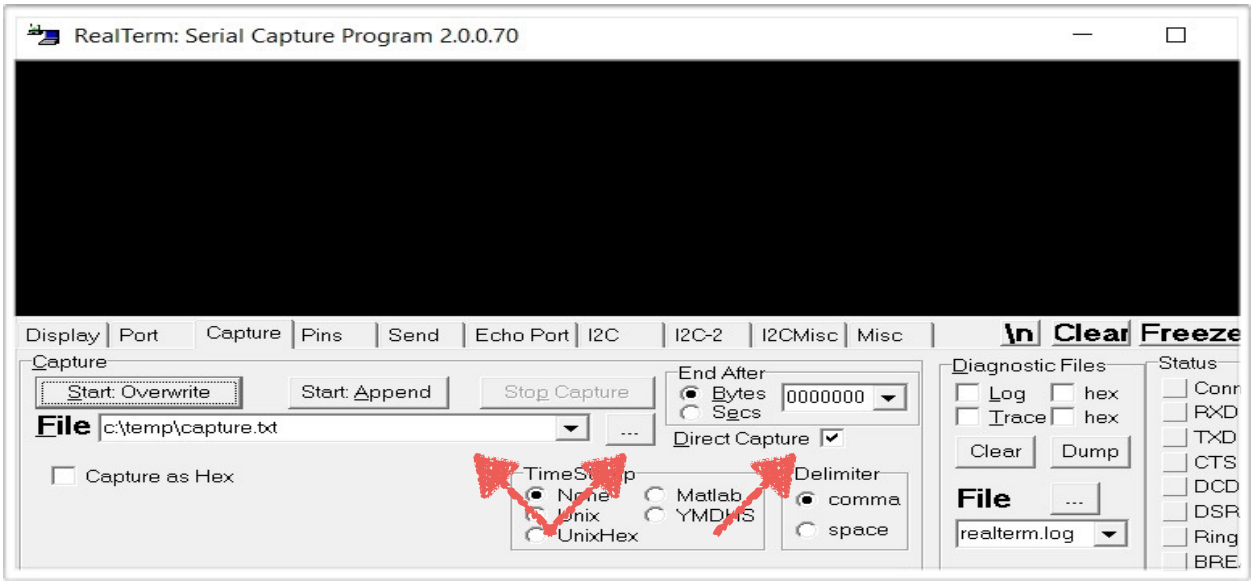
- After turning on the Hercules Sizing Tester (HST) and connecting the RS232 cable, put the HST in *Service Mode*.
  - *Service Mode* = Press & hold the *Calibrate* button while pressing the *Silence* button 3 times
- On the PC open RealTerm and perform the following under the *Port* tab:
  - Change the *Baud* drop-down from the default, typically 57600, to 19200
  - Change the *Port* drop-down to from the default 1 to a value that will begin loading formatted data to the RealTerm window.
  - Save updates by clicking the *Change* button

Upon successful completion, the read-out in yellow font will be formatted and should be displaying pertinent information as the screen-shot above demonstrates.

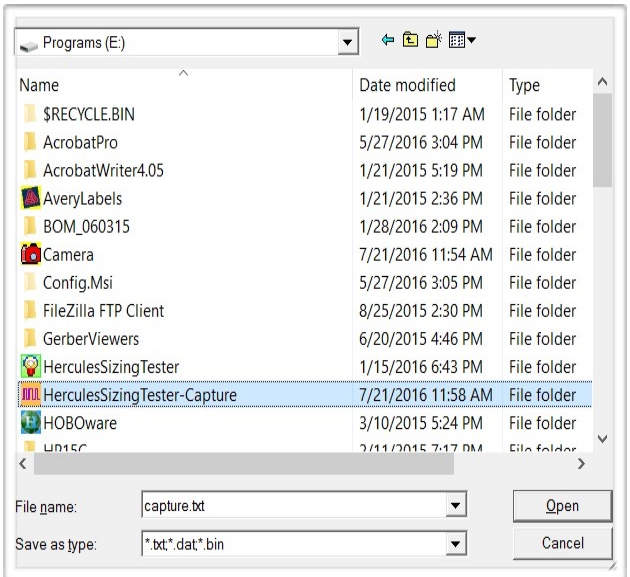
Capturing Valid Data

Once the HST and PC are communicating properly, gathering data and compiling it to a single file is taken care of by the serial capture program. This section will detail the the data output, its location, and file types.

Step 2: Setting Save Destination



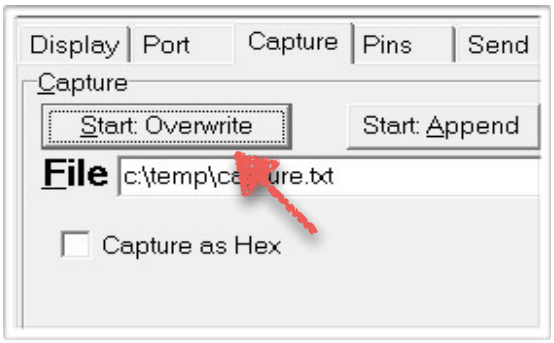
- Under the *Capture* tab, you will be presented with a *File* drop-down
  - You can set the name and the location of the file about to be produced from here



- Clicking on the ellipsis brings up the *Save As* window
- Note that the file type is initially set to (.txt)
  - It is recommended that you leave the type as is until the Sizing Test is complete. Data manipulation should be done on a copy of this to maintain the integrity of the original data.
- *Direct Capture* is, by default, on though can be turned off as a way to see the real-time data being captured in the RealTerm window.

Step 3: Logging Data *(File Overwriting)*

- When testing to get a full curve of reflectance versus time (which may be necessary if a good sizing test stop point reflectance is not yet known), then turn the set point knob on the HST all the way down to 0%, so the test will never stop the timer on screen. This makes it a bit easier to watch the progress of the test at both the HST and on the computer screen, either place, and makes it easier for two people to work together, each seeing the reflectance and time
- Having defined the Set Point, hit the Calibrate button to see feedback on the terminal window of the serial capture program
- Click on *Start Overwrite* to begin capturing data
  - Once the ink is poured on the paper sample, a real-time feed of the reflectance and other parameter changes being made to the file will be displayed
- Once the desired set point is reached, hit *Silence* on the HST and click *Stop Capture* on the RealTerm: Serial Capture Program.

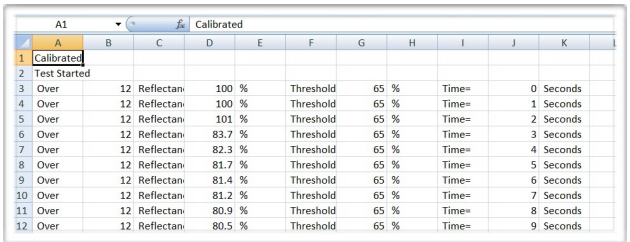


Visualizing Data

Once all data has been logged, it needs to be put to good use. An Excel template will be provided for simple copying and pasting that will produce four graphs at various zooms to allow for analysis of Sizing test.

Step 4: File Type Conversion *(.TXT to .CSV)*

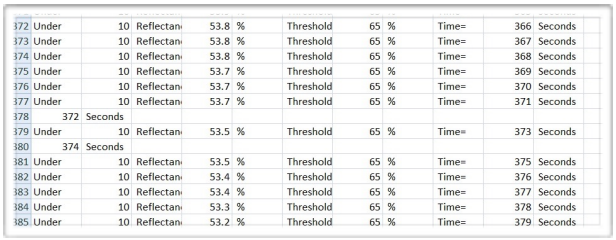
- The initial file type produced by RealTerm is .TXT. By simply making a duplicate of the file and changing the extension to .CSV the file is now comma separated values. (Duplication allows for data integrity throughout all steps)
- Open the CSV file with excel



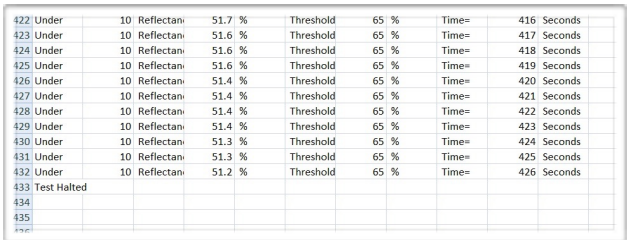
	A	B	C	D	E	F	G	H	I	J	K
1	Calibrated										
2	Test Started										
3	Over	12	Reflectan	100	%	Threshold	65	%	Time=	0	Seconds
4	Over	12	Reflectan	100	%	Threshold	65	%	Time=	1	Seconds
5	Over	12	Reflectan	101	%	Threshold	65	%	Time=	2	Seconds
6	Over	12	Reflectan	83.7	%	Threshold	65	%	Time=	3	Seconds
7	Over	12	Reflectan	82.3	%	Threshold	65	%	Time=	4	Seconds
8	Over	12	Reflectan	81.7	%	Threshold	65	%	Time=	5	Seconds
9	Over	12	Reflectan	81.4	%	Threshold	65	%	Time=	6	Seconds
10	Over	12	Reflectan	81.2	%	Threshold	65	%	Time=	7	Seconds
11	Over	12	Reflectan	80.9	%	Threshold	65	%	Time=	8	Seconds
12	Over	12	Reflectan	80.5	%	Threshold	65	%	Time=	9	Seconds

- The beginning of the file should appear like the image to left
  - Note the *Calibrated* and *Test Started* lines, they will line up with the spreadsheet template

- Also note that there may be some errors in the data captured. Pictured right is an example of RealTerm missing data points. Our spreadsheet template worked fairly well by simply deleting these few rows



372	Under	10	Reflectan	53.8	%	Threshold	65	%	Time=	366	Seconds
373	Under	10	Reflectan	53.8	%	Threshold	65	%	Time=	367	Seconds
374	Under	10	Reflectan	53.8	%	Threshold	65	%	Time=	368	Seconds
375	Under	10	Reflectan	53.7	%	Threshold	65	%	Time=	369	Seconds
376	Under	10	Reflectan	53.7	%	Threshold	65	%	Time=	370	Seconds
377	Under	10	Reflectan	53.7	%	Threshold	65	%	Time=	371	Seconds
378	372	Seconds									
379	Under	10	Reflectan	53.5	%	Threshold	65	%	Time=	373	Seconds
380	374	Seconds									
381	Under	10	Reflectan	53.5	%	Threshold	65	%	Time=	375	Seconds
382	Under	10	Reflectan	53.4	%	Threshold	65	%	Time=	376	Seconds
383	Under	10	Reflectan	53.4	%	Threshold	65	%	Time=	377	Seconds
384	Under	10	Reflectan	53.3	%	Threshold	65	%	Time=	378	Seconds
385	Under	10	Reflectan	53.2	%	Threshold	65	%	Time=	379	Seconds



422	Under	10	Reflectan	51.7	%	Threshold	65	%	Time=	416	Seconds
423	Under	10	Reflectan	51.6	%	Threshold	65	%	Time=	417	Seconds
424	Under	10	Reflectan	51.6	%	Threshold	65	%	Time=	418	Seconds
425	Under	10	Reflectan	51.6	%	Threshold	65	%	Time=	419	Seconds
426	Under	10	Reflectan	51.4	%	Threshold	65	%	Time=	420	Seconds
427	Under	10	Reflectan	51.4	%	Threshold	65	%	Time=	421	Seconds
428	Under	10	Reflectan	51.4	%	Threshold	65	%	Time=	422	Seconds
429	Under	10	Reflectan	51.4	%	Threshold	65	%	Time=	423	Seconds
430	Under	10	Reflectan	51.3	%	Threshold	65	%	Time=	424	Seconds
431	Under	10	Reflectan	51.3	%	Threshold	65	%	Time=	425	Seconds
432	Under	10	Reflectan	51.2	%	Threshold	65	%	Time=	426	Seconds
433	Test Halted										
434											
435											

- Finally scroll down to the bottom of the data and find the *Test Halted* row. This will be important to know once you start pasting into the spreadsheet template. It will serve as a reference point on where to delete excess rows (sample data)

Step 5: Copy & Pasting into Excel Spreadsheet Template

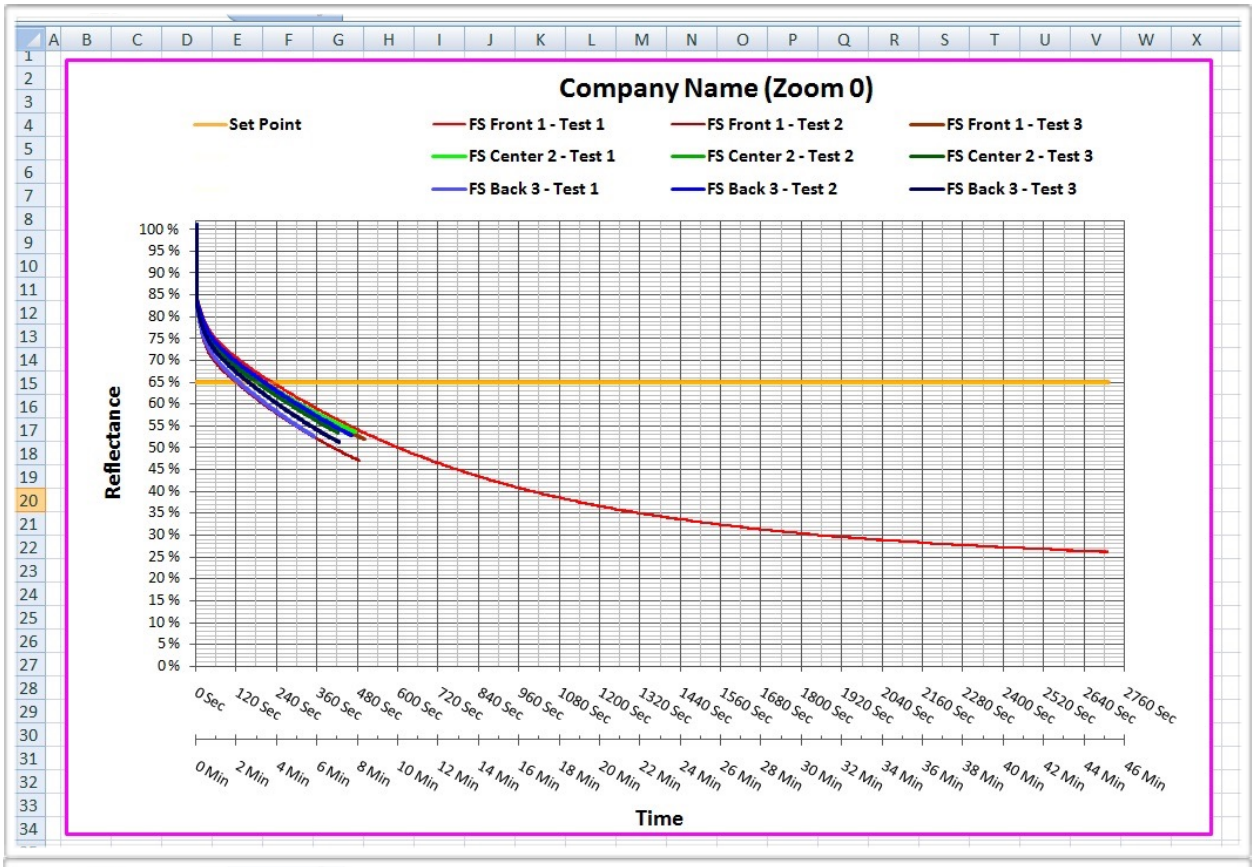
- Upon opening the Excel spreadsheet template, a common heading section for every sheet within the Excel workbook will be presented. Here you can change:
  - *Company Name, Paper Type & Sample Number*
  - *Ink Type & Hercules Sizing Tester used*
  - *Date, Start Time & Duration*
  - *Temperature, Relative Humidity, Dew Point, & Ink Temperature*

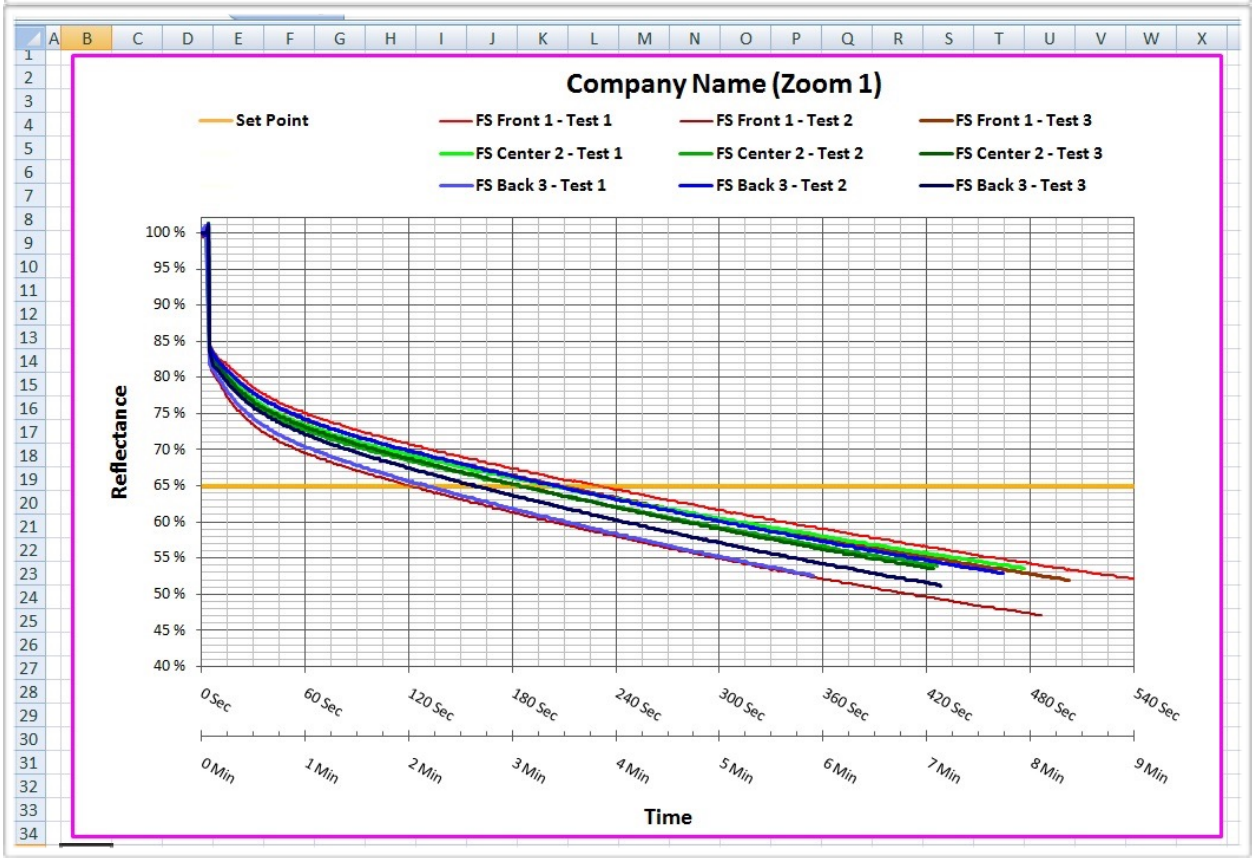
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Company Name		FS Front 1		Test 1									
2	0% Formic Acid Ink			Temperature		DB		°F	For Graph Titles:					
3	TAF-311			Relative Humidity		RH		%	**FS Front 1 - Test 1**					
4	Date	MM/DD/YYYY			Dew Point	DP		°F						
5	Start Time			Ink Temperature		IT		°F				Ink Pour		
6	Duration	45 minutes			At Time	@T						Time Adjust		
7												-3 Sec		
8							Set Point							
9	Calibrated													
10	Test Started													
11	Over	12	Reflectance=	100	%	Threshold=	65	%	Time=	0	Seconds	0 Sec	0.000 Min	
12	Over	12	Reflectance=	100.4	%	Threshold=	65	%	Time=	1	Seconds	-2 Sec	-0.033 Min	
13	Over	12	Reflectance=	100.6	%	Threshold=	65	%	Time=	2	Seconds	-1 Sec	-0.017 Min	
14	Over	12	Reflectance=	100.3	%	Threshold=	65	%	Time=	3	Seconds	0 Sec	0.000 Min	
15	Over	12	Reflectance=	100.3	%	Threshold=	65	%	Time=	4	Seconds	1 Sec	0.017 Min	
16	Over	12	Reflectance=	100.4	%	Threshold=	65	%	Time=	5	Seconds	2 Sec	0.033 Min	
17	Over	12	Reflectance=	100.5	%	Threshold=	65	%	Time=	6	Seconds	3 Sec	0.050 Min	
18	Over	12	Reflectance=	90.2	%	Threshold=	65	%	Time=	7	Seconds	4 Sec	0.067 Min	
19	Over	12	Reflectance=	83.8	%	Threshold=	65	%	Time=	8	Seconds	5 Sec	0.083 Min	
20	Over	12	Reflectance=	83.4	%	Threshold=	65	%	Time=	9	Seconds	6 Sec	0.100 Min	
21	Over	12	Reflectance=	83.1	%	Threshold=	65	%	Time=	10	Seconds	7 Sec	0.117 Min	

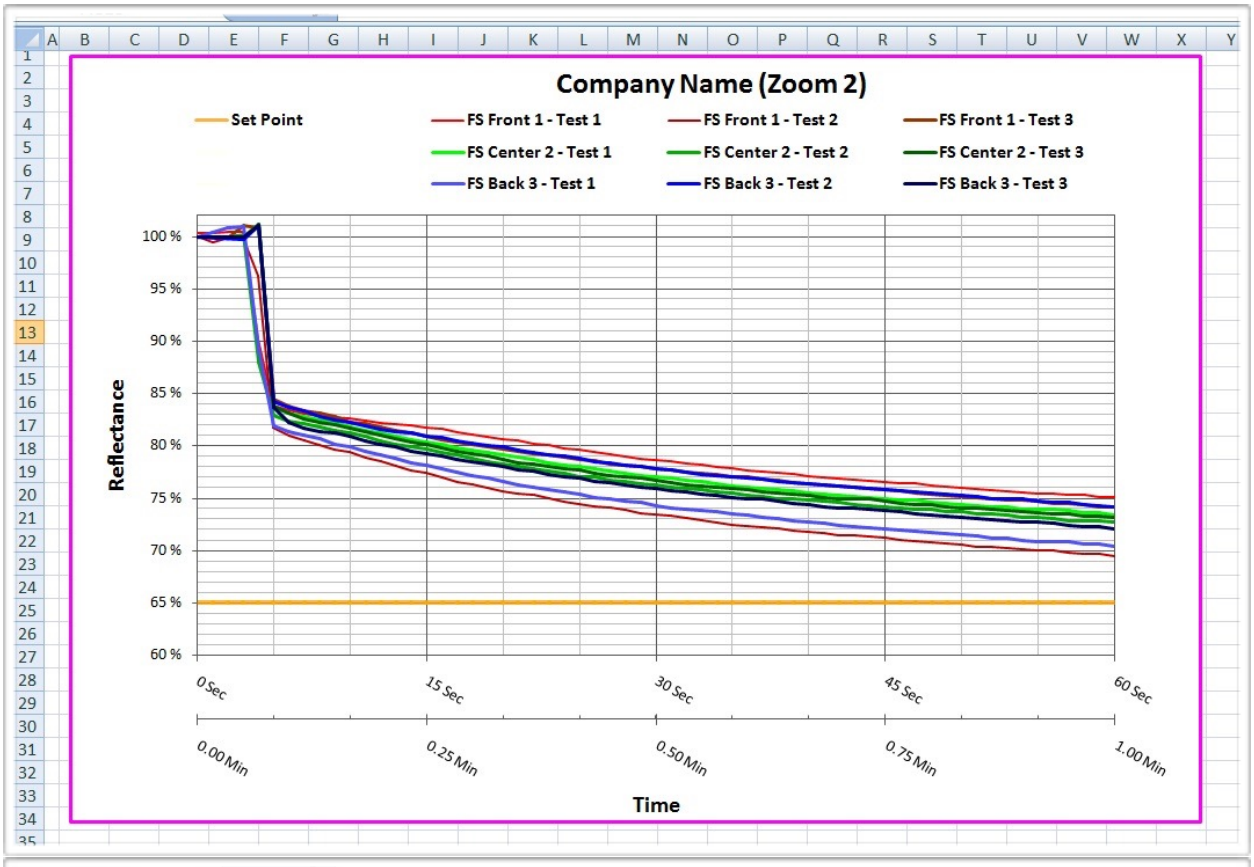
- Also important to note is that there are additional columns:
  - Second from the right — Column L — is used to take into account the seconds before the ink makes contact with the paper sample. Zoom 3 will allow you to make the best adjustment. It may vary from sample to sample.
  - Furthest right — Column M — is used to calculate total duration.

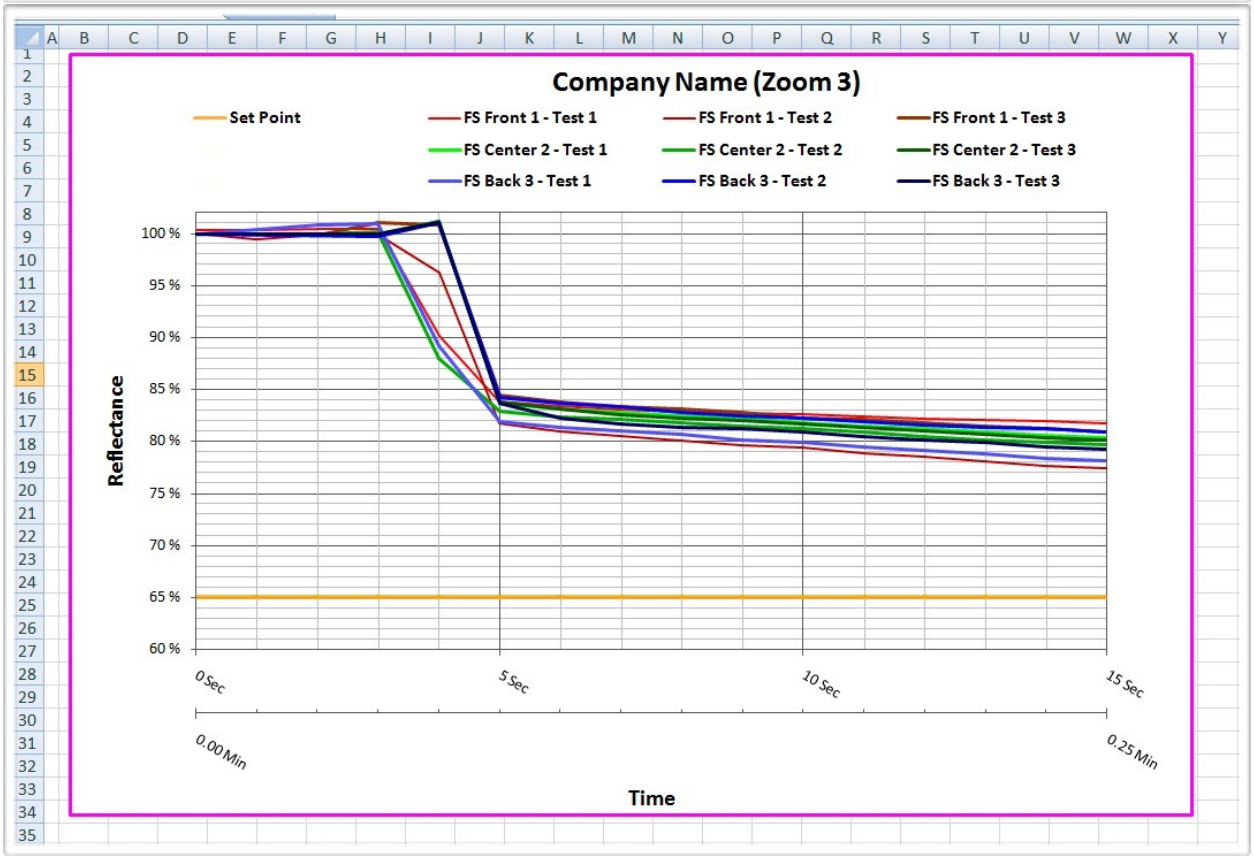
2710	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2698	Seconds	2695 Sec	44.917 Min
2711	Under	10	Reflectance=	26.3	%	Threshold=	65	%	Time=	2699	Seconds	2696 Sec	44.933 Min
2712	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2700	Seconds	2697 Sec	44.950 Min
2713	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2701	Seconds	2698 Sec	44.967 Min
2714	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2702	Seconds	2699 Sec	44.983 Min
2715	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2703	Seconds	2700 Sec	45.000 Min
2716	Under	10	Reflectance=	26.3	%	Threshold=	65	%	Time=	2704	Seconds	2701 Sec	45.017 Min
2717	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2705	Seconds	2702 Sec	45.033 Min
2718	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2706	Seconds	2703 Sec	45.050 Min
2719	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2707	Seconds	2704 Sec	45.067 Min
2720	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2708	Seconds	2705 Sec	45.083 Min
2721	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2709	Seconds	2706 Sec	45.100 Min
2722	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2710	Seconds	2707 Sec	45.117 Min
2723	Under	10	Reflectance=	26.2	%	Threshold=	65	%	Time=	2711	Seconds	2708 Sec	45.133 Min
2724	Under	10	Reflectance=	26.3	%	Threshold=	65	%	Time=	2712	Seconds	2709 Sec	45.150 Min
2725	Test Halted												
2726													
2727													
2728													

- Zoom 3 (pg. 7) highlights the difference in pour times. The goal is to align the ink pour finish time by changing Column L, Row 6 (L,6) *Example: -3 shifts the graph three seconds to the left*


Company Name (Zoom 0)
Set Point
FS Front 1 - Test 1
FS Front 1 - Test 2
FS Front 1 - Test 3
FS Center 2 - Test 1
FS Center 2 - Test 2
FS Center 2 - Test 3
FS Back 3 - Test 1
FS Back 3 - Test 2
FS Back 3 - Test 3
Reflectance
Time


Company Name (Zoom 1)
Set Point
FS Front 1 - Test 1
FS Front 1 - Test 2
FS Front 1 - Test 3
FS Center 2 - Test 1
FS Center 2 - Test 2
FS Center 2 - Test 3
FS Back 3 - Test 1
FS Back 3 - Test 2
FS Back 3 - Test 3
Reflectance
Time


Company Name (Zoom 2)
Set Point
FS Front 1 - Test 1
FS Front 1 - Test 2
FS Front 1 - Test 3
FS Center 2 - Test 1
FS Center 2 - Test 2
FS Center 2 - Test 3
FS Back 3 - Test 1
FS Back 3 - Test 2
FS Back 3 - Test 3
Reflectance
100 %
95 %
90 %
85 %
80 %
75 %
70 %
65 %
60 %
0 Sec
15 Sec
30 Sec
45 Sec
60 Sec
0.00 Min
0.25 Min
0.50 Min
0.75 Min
1.00 Min
Time


Company Name (Zoom 3)
Set Point
FS Front 1 - Test 1
FS Front 1 - Test 2
FS Front 1 - Test 3
FS Center 2 - Test 1
FS Center 2 - Test 2
FS Center 2 - Test 3
FS Back 3 - Test 1
FS Back 3 - Test 2
FS Back 3 - Test 3
Reflectance
100 %
95 %
90 %
85 %
80 %
75 %
70 %
65 %
60 %
0 Sec
5 Sec
10 Sec
15 Sec
0.00 Min
0.25 Min
Time