

# Appendix 3 V1.1B Features

The v1.1B of the Valve Spring Tester adds several new features, which are described in this Appendix. In addition, the Automatic Spring Tester was released after the original publication of this manual, so some of its features will be described here also.

## Calculation and Accuracy Improvements:

A new Shim report has been added, which lets you specify different shim requirements and the program automatically finds the best shims for each spring to meet those requirements. See Figure A9.

A Valve Lift input has been added to the Quick Check screen so you can quickly find a seated height which meets your seated force requirements and quickly shows bind height clearance. See Figure A10.

A new, faster “Gen 3” USB logger has been released, which records more data and provides for better accuracy. You need this v1.1B to read that logger.

## Operation:

Graph printouts now have no border around the graph, so there are no broken lines on the left side of the printed graph. See Figure A11.

Program has added Graph Format option to display the Legend Titles to appear in 3 different font sizes, larger than the standard font. See Figure A12.

Program now allows up to 100 data points for graphs and/or reports.

Program now automatically checks for proper USB logger, and warns you if you have chosen the wrong one.

Program now disables the 'Settings' option on main screen until you have opened a previous test as a template.

There is a new Preference to allow for showing when calibration numbers do not match those of the master tester specs. This could cause confusion to some users. The Preference also lets you set this to 'Always', which is very handy for troubleshooting.

Company Logo is now displayed on Main Screen.

Program has added Export to Excel option to screen for saving ASCII data files. See Figure A14.

Program has added a Browse button screen for saving ASCII data files. See Figure A14.

Program has several improvements so it is more accurate when calibrating force from a known spring. It also has more explanation about calibrating with a known spring and further identify if you must include a retainer for doing the calibration.

When switching program or file from Metric to English units or vice versa, the program now also converts the Quick Check settings and Spring Height scales in the Electronics screen.

Program has a New Preference of “Warn About Slowing Data Recording” which you can set to 'No' to stop the "nag" screen we added.

Figure A7 New, Faster Mini Logger  
(looks same from outside as previous  
logger)



Program now warns you if tester encounters a force which is close to over-ranging and damaging the load cell. This can be due to too force from user, or testing springs which are too large for the range of load cell. The program may be able to still use the data for a valid test, but just warn you.

Starting with Windows Vista, the Operating System works best if the data files for programs are stored in a “public” folder, and not with the program files under C:\Program Files or C:\Program Files(x86) folder. For some brands of computers, this is not a big problem, for other brands, and or newer operating systems like Windows 8 or newer, this can be a big problem. Therefore, starting with this v1.1 B, we are storing the data files for Vista, Windows 7, Windows 8, Windows 10 in the folder path of:

C:\Users\Public\Public Documents\Performance-Trends-Data\Valve-Spring-Tester-Files

Therefore, if you want to copy data files using Windows Explorer, or other types of browsers, start looking in this location. See Figure A15.

## Automatic Valve Spring Tester:

The Automatic Spring Tester uses an air cylinder to stroke the valve spring into bind, then allowing the spring to return to is fully open height, and then retract back to it’s fully retracted position. All these different steps may need to be “tweaked” depending on the air pressure supply, length and/or force of the valve springs, or your particular spring tester. Some of the items listed below identify different settings in the program to tweak these steps. See Figure A13.

### Notes:

Since the Automatic Spring Tester is powered by compressed air, the amount of force the tester can generate depends on the air pressure. The standard tester with a 4 inch cylinder can generate about 12 lbs of force for each PSI of air pressure, or about 1500+ lbs at 130 psi shop air pressure. The optional High Pressure tester with a 5 inch cylinder can generate about 19.5 lbs for each PSI of air pressure, or about 2500+ lbs at 130 psi shop air pressure. A clean, steady supply of high pressure shop air will help the Automatic Tester operate reliably and accurately.

You must choose one of the “Automatic tester” or the “Gen III” logger types under Settings, then Tester Calibration to see all of these features in the program.

There is an Option in the Electronics Recording Screen, under "Automatic Tester Utilities" called Maximum Compression Time, the amount of time before the tester assumes there is not enough force for bind, and stops compressing. Click on Options, then Automatic Tester, then Maximum Compression Time to change this. The default of 15 seconds is typical a good setting.

There is an Option in the Electronics Recording Screen, under "Automatic Tester Utilities" called "Retract Setpoint". The default is 10 units, but can be adjusted by the user. If you find the tester is not retracting once the spring is fully open, try increasing this number.

There is an Option in the Electronics Recording Screen, under "Automatic Tester Utilities" called Number of Pre-Test Cycles. Many engine builders believe you get a more accurate, repeatable number if you run the valve spring into bind a few times before you make your final measurement. These Pre-Test Cycles are sometimes called “bull nosing”. Zero 0 is the default setting.

There is an Option in the Electronics Recording Screen, under "Automatic Tester Utilities" called Safety Setting – Minimum Clearance. This is the amount of clearance allowed between the 2 plattens. This should be set low enough to be less than your spring’s bind height, but not so low as fingers could be crushed.

In Preferences, there are also some Automatic Spring Tester settings to note:

Figure A8 Automatic Spring Tester



Click on Settings, then Preferences, then General Operation tab at the top. The Preference of “Auto Tester, Pause after Bind” is the amount of time the tester will set at bind before retracting. If the tester seems to be “hanging up” at the bind condition, try changing this setting. Zero (0) is the default setting.

Click on Settings, then Preferences, then General Operation tab at the top. Set the Preference of “Auto Tester has High Force Option” to Yes, if you have the High Force tester with 5” diameter air cylinder. This adjusts the cycle parameters some, and accurately shows the approximate air pressure be supplied to the tester. No is the default setting.

The approximate air pressure being supplied to the Auto Tester is now displayed on the recording screen. This can help you troubleshoot problems if the spring is not being compressed sufficiently or quickly.

An info message has been added for if the spring tester exceeds the 'Auto Tester Max Compression Time' and possible reason being 'Digital Retract Offset'.

The Auto Spring Tester now stops it's test cycle when it encounters a force which is close to over-ranging and damaging the load cell. This can be due to too much air pressure, or testing springs which are too large for the range of load cell. The program may be able to still use the data for a valid test, but just warn you.

Figure A9 Shim Report

**Report Options**

**Report Specs**

Type: Intake & Exhaust Shimming

Desired Seated Force, Int: 70

Desired Seated Force, Exh: 40

Acceptable Bind Clearance, Int: .06

Acceptable Bind Clearance, Exh: .06

Step Size, inches: .015

Force Must be Greater than Desired: Yes

**Notes:**  
 Select the type of report to make, then click on the Make Report button. Towards the bottom of the list you will see options for Comparison Reports, to compare one set of springs with one or more sets of springs (other test files). You will pick the tests for comparison by clicking on 'History Log' at the top of the Report Screen.

Make Report Help Cancel Print

Start by choosing the Shimming Report, and then these shim options become visible.

Set how much Seated Force you require.

Set how much Bind Clearance you require.

Because shims typically come in different increments, choose the increment (step) size for the shims you have available.

Choose No and the program finds the shim giving the force closest to your desired seated force, which could be less than the desired force. Choose Yes and the program finds the shim giving the force closest and greater than your desired seated force.

These settings from Test Options screen determine the valve lift required for the cam you are using.

Your desired Seated Forces show here.

Valve Spring Tester 'Plus' v1.1B [ Typical Valve Spring ]

Back Print Report Types File History Log Help

Comments

Test Time: 10:15 am  
 02/24/2003

Open Ht: Int: 1.204, Exh: 1.197  
 Seated Ht: Int: 1.740, Exh: 1.740  
 Retainer: .100  
 Seal F: >70.0  
 Report of: Intake\_Exhaust Std Report  
 Operator: Jack  
 Errors: None

Cylinder	Spring Rate	Open Force	Open Height	Seated Force	Seated Height	Non Linear %	Bind Ht	Clearance	Shim	Possible Valve Lift
Int 1	285.0	228.4	1.204	75.6	1.740	12.4	.936	.028 < .06	.240	.504
Exh 1	236.6	171.4	1.197	43.0	1.740	2.4	.937	.155	.105	.638
Int 2	281.3	226.0	1.204	75.2	1.740	10.8	.936	.028 < .06	.240	.504
Exh 2	238.7	173.2	1.197	43.6	1.740	3.3	.936	.156	.105	.639
Int 3	284.8	228.3	1.204	75.6	1.740	11.7	.936	.028 < .06	.240	.504
Exh 3							.937	.155	.105	.638
Int 4							.935	.029 < .06	.240	.505
Exh 4							.933	.159	.105	.642
Int 5							.942	.037 < .06	.225	.513
Exh 5							.935	.157	.105	.640
Int 6							.933	.046 < .06	.225	.522
Exh 6					1.740	2.9	.937	.155	.105	.638
Int 7					1.740	7.3	.935	.044 < .06	.225	.520
Exh 7	240.1	174.6	1.197	44.2	1.740	3.0	.938	.154	.105	.637
Int 8	257.4	210.1	1.204	72.1	1.740	5.8	.936	.043 < .06	.225	.519
Exh 8	239.6	173.8	1.197	43.7	1.740	2.3	.937	.155	.105	.638
Int. Maximum	286.5	230.1	1.204	76.6	1.740	12.4	.942	.046	.240	.522
Int. Minimum	257.4	210.1	1.204	72.1	1.740	5.8	.933	.028	.225	.504
Int. Spread	29.1	20.0	.000	4.5	.000	6.6				
Int. Average	274.6	221.5	1.204	74.3	1.740	9.9				
Exh. Maximum	241.2	174.6	1.197	44.2	1.740	3.3				
Exh. Minimum	236.6	171.4	1.197	43.0	1.740	2.3				
Exh. Spread	4.6	3.2	.000	1.2	.000	1.0				
Exh. Average	238.9	173.4	1.197	43.7	1.740	2.8				

Shim required to meet your Seated Force requirement.

This shows how much valve lift is possible to meet your requirements of Seated Force and Bind Clearance.

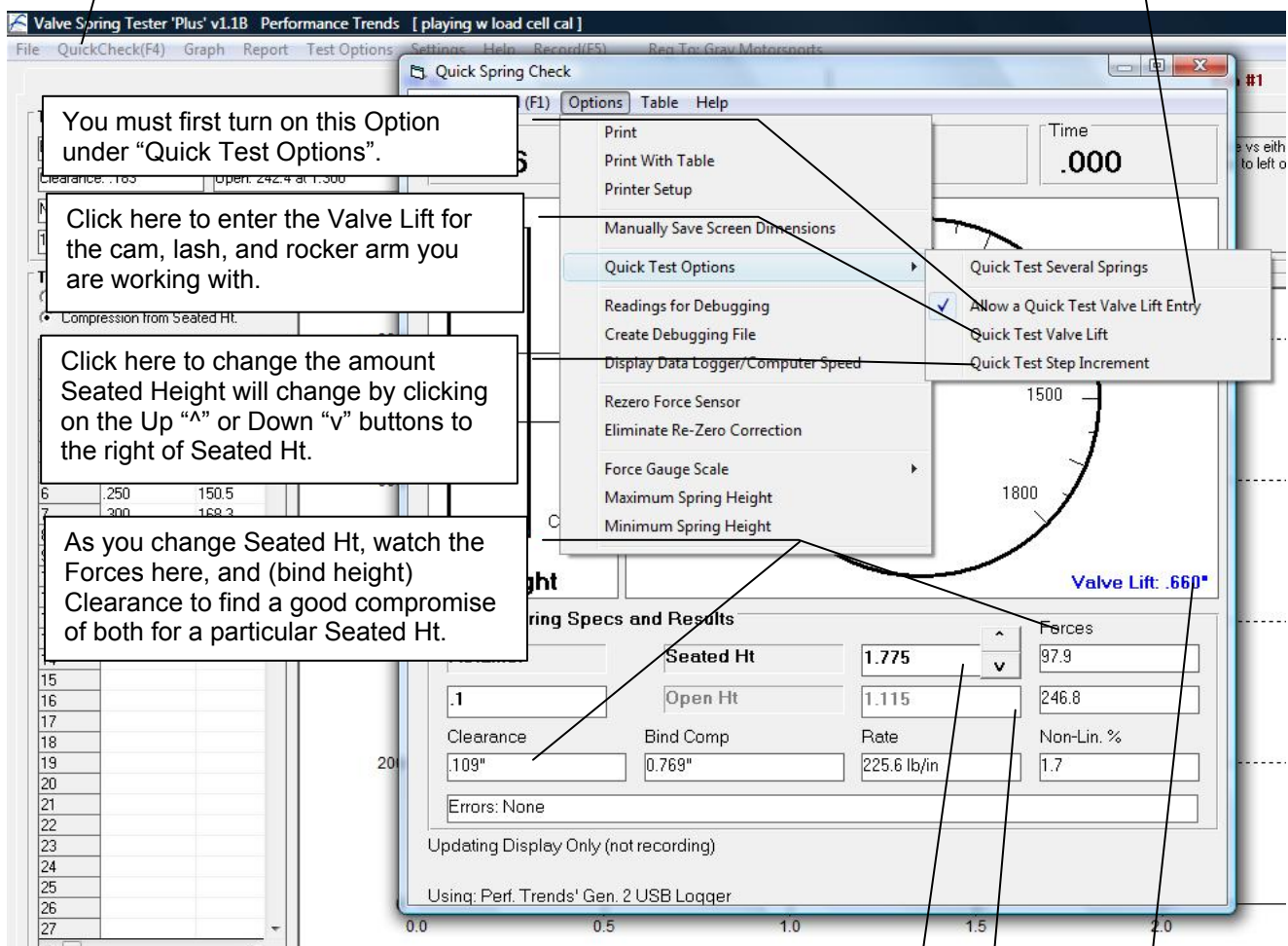
Flag for Clearance spec not being met.

Note that Int and Exh minimum Seated Forces are greater than your Desired Force, as selected for "Force Must be Greater than Desired" in screen above.

Figure A10 Valve Lift on Quick Check Screen

This feature is only available for "Quick Check" screen, by clicking here or pressing F4.

This "Valve Lift" feature is designed to let you quickly find a Seated Height which works well with a particular cam (Valve Lift) you are working with, producing enough Seated Force but still allowing for enough Bind Height Clearance.



You must first turn on this Option under "Quick Test Options".

Click here to enter the Valve Lift for the cam, lash, and rocker arm you are working with.

Click here to change the amount Seated Height will change by clicking on the Up "A" or Down "v" buttons to the right of Seated Ht.

As you change Seated Ht, watch the Forces here, and (bind height) Clearance to find a good compromise of both for a particular Seated Ht.

As you type in a new Seated Ht (or used the arrow buttons to the right to increment it), the Forces, Open Ht, Rage and Clearance are all updated. This lets you quickly find the Seated Ht which works for the particular requirements for the cam and valve train you are working with.

Open Ht is disabled because it is calculated from the Seated Ht entered above it and the Valve Lift you have entered.

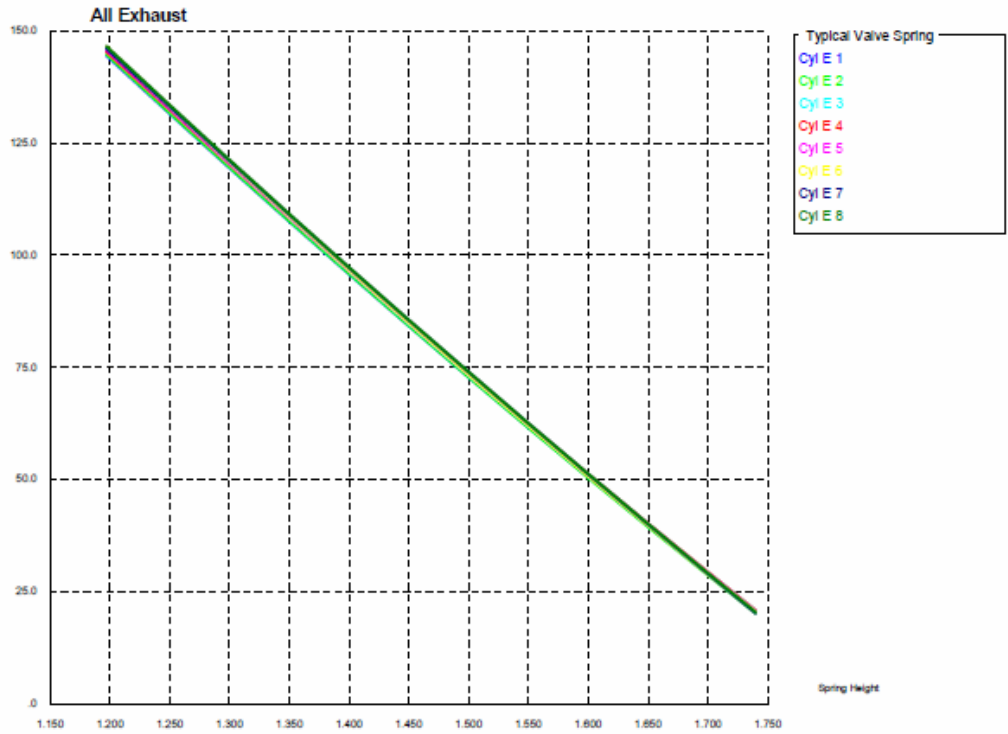
The Valve Lift you enter under Options is shown here. You can also click on this reading and enter Valve Lift directly without going through Options.

Figure A11 New Graph Printout



Valve Spring Tester 'Plus' v1.1B GRAY MOTORSPORTS  
 Test: Typical Valve Spring 704-809-1070  
 Folder: examples Performance Trends (C) 2013

This Graph Printed:  
 9:05 am 11-01-15  
 Page: 1



Graph Comments would go here, if you select to do so.													
Test Summary and Comments for: Typical Valve Spring													
Test Time		Open Ht	Seated Ht	Retainer	Ht for:	Graph of:	All 8 Cylinders						
10:15 am	Int:	1.204	1.740	.100	100. lb	Operator:	Jack						
02/24/2003	Exh:	1.197	1.740	.100	150. lb	Errors:	None						
Example of 16 stock 5.0L Mustang valve springs Limits in the Test Options will flag out spring rates which fall outside the range of 240 to 250 lbs/inch. Note that Exh #2 is too high, at 250.1 lb/in													
Lift	1.197	1.200	1.250	1.300	1.350	1.400	1.450	1.500	1.550	1.600	1.650	1.700	1.740
Cyl E 1	144.5	143.7	131.5	119.4	107.5	95.8	84.2	72.8	61.5	50.5	39.6	28.8	20.4
Cyl E 2	144.7	144.0	131.7	119.6	107.6	95.8	84.2	72.8	61.5	50.4	39.4	28.6	20.1
Cyl E 3	145.6	144.9	132.5	120.3	108.3	96.5	84.8	73.4	62.1	50.9	40.0	29.2	20.7
Cyl E 4	145.3	144.6	132.4	120.3	108.4	96.6	85.0	73.5	62.2	51.1	40.1	29.3	20.7
Cyl E 5	145.8	145.1	132.7	120.5	108.5	96.6	84.9	73.4	62.1	50.9	39.9	29.1	20.6
Cyl E 6	146.4	145.6	133.1	120.8	108.7	96.7	85.0	73.4	62.0	50.8	39.8	28.9	20.4
Cyl E 7	146.0	145.2	133.0	120.9	108.9	97.1	85.4	73.8	62.4	51.1	39.9	28.9	20.2
Cyl E 8	146.6	145.8	133.4	121.2	109.2	97.3	85.5	73.9	62.5	51.2	40.1	29.1	20.4

New graph style eliminates the lines to the left and right of the graph. These lines could appear broken on some styles of printers.

Figure A12 New Graph Feature, Larger Legends

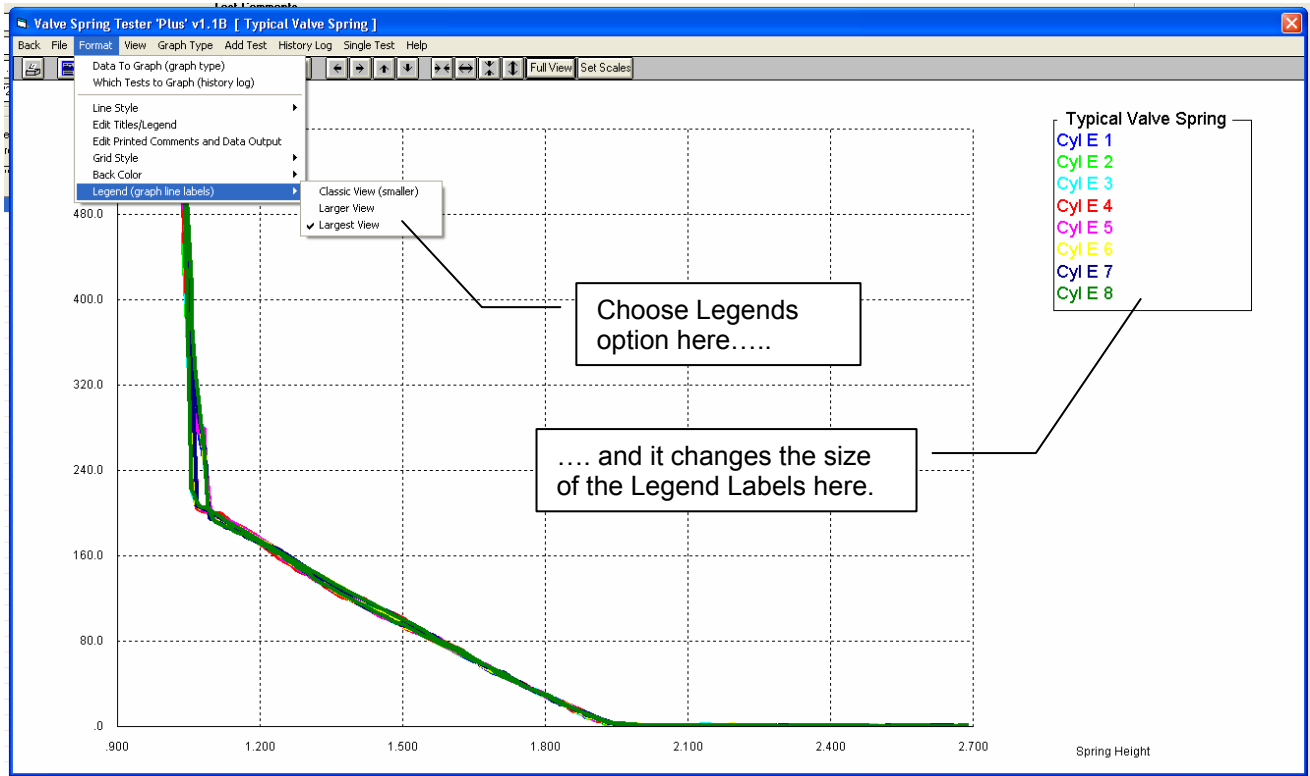


Figure A13 Automatic Spring Tester Options

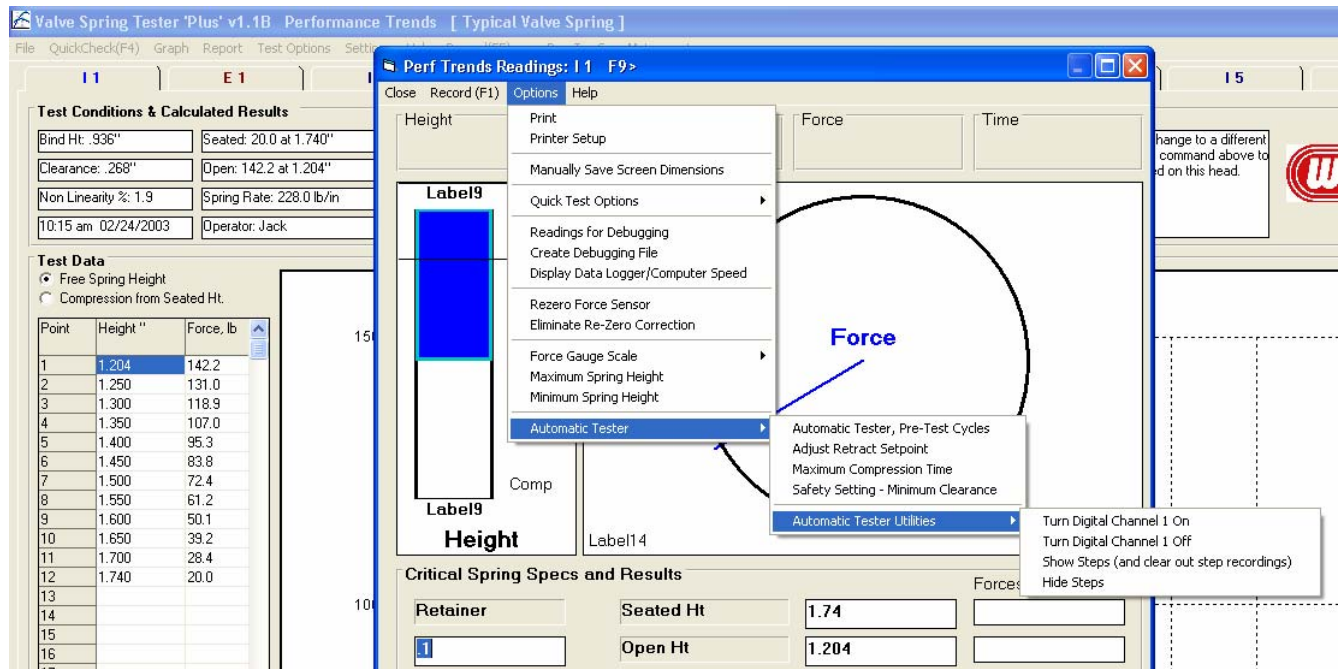


Figure A14 New ASCII File Options

Click on File for Save as ASCII File Screen

Check new Excel Option

Click Browse for Browse window shown below

Test Time	Open Ht	Seated Ht	Retainer	Seat F	Report of	Intake	Errors
10:15 sec	1.204	1.740	100	50.0	Operator: Jack		

Add a \'.csv\' Extension?

To be used by Excel, it is recommended to add a \'.csv\' extension to this file name, to create:

C:\Documents and Settings\Kevin Gertgen\Desktop\kevin spring.csv

Is this the name you want to use?

Yes No Cancel

If you click "Save File" button and have not set some options properly for Excel .csv file format, the program helps you do this correctly.

Use \'.Comma Separated\'?

To be used by Excel, it is recommended to choose \'.Comma Separated\'.

Should the program make this change also?

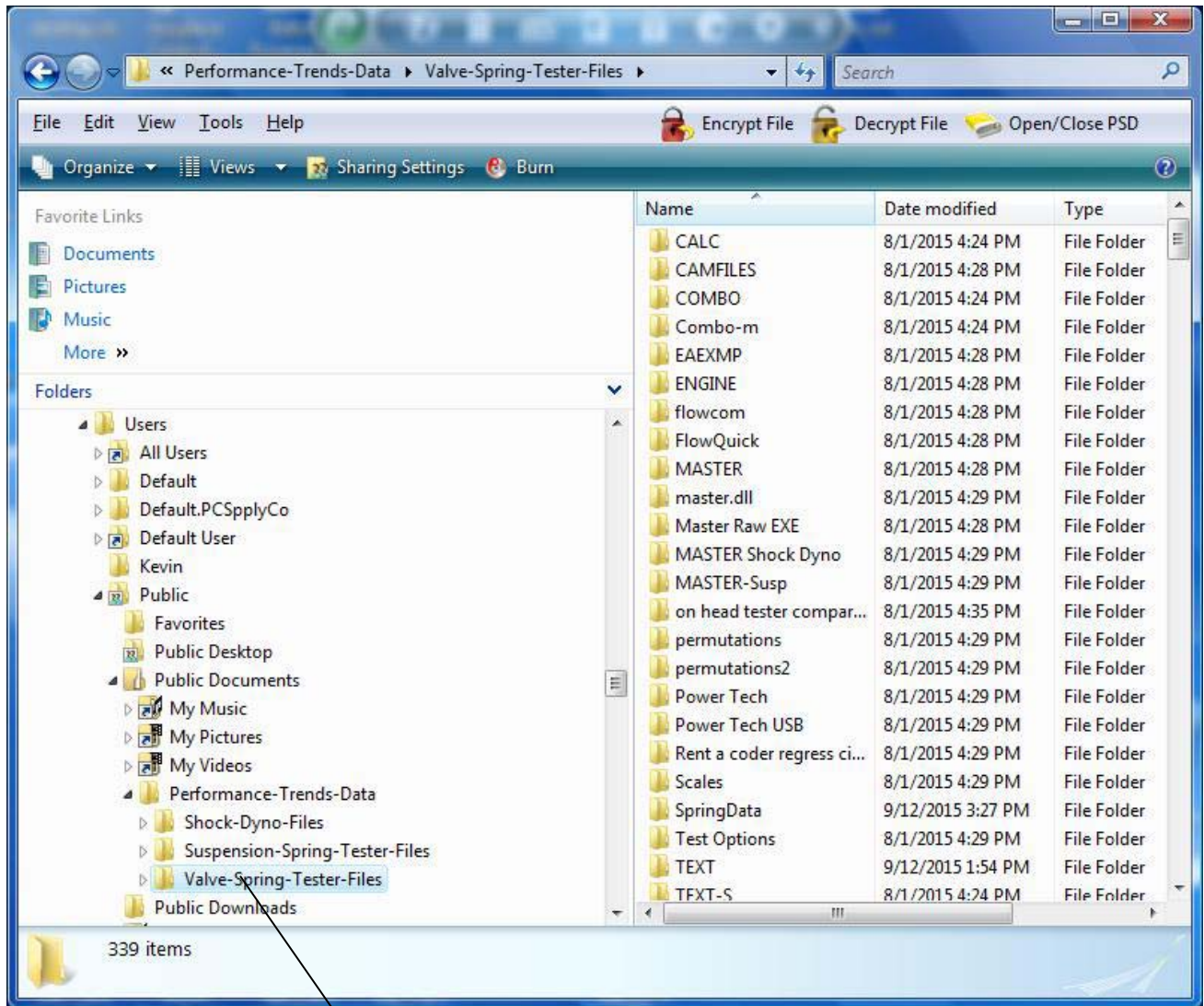
Yes No Cancel

	A	B	C	D	E	F	G	H	I	J
1	241.5	182.7	1.204	53.2	1.74	3.5	0.936	0.118	0.15	0.594
2	236.6	171.4	1.197	43	1.74	2.4	0.937	0.155	0.105	0.638
3	242.1	184.5	1.204	54.8	1.74	4.7	0.936	0.118	0.15	0.594
4	238.7	173.2	1.197	43.6	1.74	3.3	0.936	0.156	0.105	0.639
5	243.2	184.1	1.204	53.7	1.74	3.4	0.936	0.118	0.15	0.594
6	238	173	1.197	43.8	1.74	2.8	0.937	0.155	0.105	0.638
7	241.6	183.9	1.204	54.4	1.74	3.9	0.935	0.119	0.15	0.595
8	237.8	173.4	1.197	44.2	1.74	3.1	0.933	0.159	0.105	0.642
9	243.4	184.6	1.204	54.1	1.74	3.3	0.942	0.112	0.15	0.588
10	239	173.6	1.197	43.8	1.74	2.9	0.935	0.157	0.105	0.64

The .csv file created opens directly in Excel. If you had checked any of the other options like "Include Text" or "Convert to Columns", those changes would also appear in the Excel file.



Figure A15 New Location for Spring Tester Data Files (not for XP or older)



Valve Spring Tester data files are stored in this folder.



# Appendix 4 V1.1C Features

The v1.1C of the Valve Spring Tester adds several new features, which are described in this Appendix.

## Calculation and Accuracy Improvements:

In Test Options, you now have the choice for Test Type of:

- Smooth Data, compress to bind (the original and default Test Type)
- Smooth Data, do not compress to bind
- 'Bent' Data, compress to bind
- 'Bent' Data, do not compress to bind

'Bent' Data would be for springs where you may encounter a 2nd spring half way through the stroke, or the spring curve has a VERY unusual graph of force vs compression. There is a button in the Test Options screen to explain these 4 options. Fig A17.

For Test Types for No Bind, the max compression is now called 'End Ht' instead of Bind Height.

A major new Test Option is being able to choose "Allow Individual Seated Heights". This lets you specify the seated heights of each spring individually. Because this option can cause confusion if you do not want to use it, it must be turned On in Preferences under 'Operation, cont' tab as 'Allow Individual Seated Heights'. Fig A18 and 19.

We've added an option in the Test Conditions screen to explain how you still need to enter a Seated and Open Height to get Valve Lift even though you are entering Individual Seated Heights.

In the Recording screen, there is a new Option called 'Adjust Length Sensor'. It is similar to rezeroing the force sensor, except you install a known height standard where the spring would go, and squeeze the standard. The program asks what the height of the standard is, and the program adjusts the calibration to exactly match this height in the future. Fig A20.

A new Report Type of "Heights for Forces" has been added to report Spring Heights which produce different amounts of force, say in 10 lb increments. Fig A21.

There is a new Preference under 'Operation, cont' called 'Use Linear Adjustment Factor' for the length sensor calibration. If set this to Yes, you can calibrate the length sensor with 3 or more standard heights. This will then allow for any slight 'bend' in the length sensor calibration curve for a small improvement in the spring tester accuracy. Fig A22.

A new 12 bit "Gen 3" USB logger has been released, which records the stroke or lift data with more precision than the previous "Gen 3" logger. The software can tell if the logger is the older 10 bit or new 12 bit, so you do not have to tell the software which type of board you have. (The v1.1B could read this logger also.) Fig A16.

## Operation:

For Reports and Graphs, the program now asks you in a separate input if you want data for Intake, Exhaust, or Intake and Exhaust. Fig A21.

You can now select to do Intake, Exhaust, or Intake & Exhaust for the Force vs Height Details report. Previously, it was only Intake & Exhaust.

There is a new Preference setting under 'Operation, cont' tab called 'Ask about errors when they happen'. This is set to 'Yes' by default, and is the way the program has always worked in the past. However, if you enter, say, an Open Height which is lower than Bind Height (impossible condition), the program could ask you MANY questions about this problem for all springs

Figure A16 New, 12 Bit Mini Logger (looks same from outside as previous logger)



affected. Now, if you set this Preference to No, the program will just report the Open Force as 0 because it could not be measured based on the Open Height you have given the program. Results which can not be obtained are now highlighted in red on the main screen. Fig A22 and 23.

We've fixed a bug where if the program asked you about entering a new Open or Seated Height because what you have entered did not make sense for this spring, the program would not let you cancel out of the question. Now you can cancel out and leave your heights as they are.

When Starting a New Test, the fields for entering the Test and Folder names are now larger to allow for easily making longer names. The same is true when Saving a file, and for most fields in the program for the test file name and folder name. If you cancel out of starting a new test, the program now explains any changes you have made will not be saved. Fig A24.

You can now display the Tests listed by Date Last Accessed (or changed), option called 'List by Access Date'.

The program is using new routines for better naming of file names by adding numbers to the end of the names. If you want a file name to be, say, 'Joe Smith', the program used to suggest adding a number to the end to create 'Joe Smith1'. If you would do more than 9 tests, these tests would not be listed alphabetically in order. Now the program suggests this name to be 'Joe Smith001', so tests will be listed alphabetically, at least for the first 1000 tests you run with this name. Fig A24.

You can now Filter (search for) tests by File Name. Fig A27.

Now Filtered Files (searched for and found) are displayed in Notepad with better spacing to allow for very long file and folder names. Fig A27.

In the Open a Test screen, you now have several options to Add, Delete, Copy, Rename and Merge folders. Fig A25.

Files and folders you now delete from inside the program are sent to the computer's Recycle Bin, so they can be recovered if need be. Fig A25.

The program now displays the Valve Lift for entering simple inputs of Seated and Open Heights, which saves you from doing the math in your head.

There is a new Preference setting under 'Operation, cont' called 'Load Cell Overload Allowed'. The program tries to prevent you from overloading the load cell (squeezing a spring too much). This is to prevent damage, and this setting should be kept at 0 for all Performance Trends spring testers. However, for some retro-fits, the other brand's load cells could have been undersized. For this condition, you may have to allow a certain percentage of overload to the the same operation you had with the previous software. Fig A22.

The Graph on the main screen now has a title to clearly state whether the data is graphed 'vs Free Standing Spring Ht' or 'vs Compressed Spring Ht', the units being used (inches " or mm, KG, etc) and the retainer thickness used during the test. Fig A28.

In Version 1.1B, we started to store data files in a different folder for Vista, Windows 7, Windows 8, Windows 10, typically:

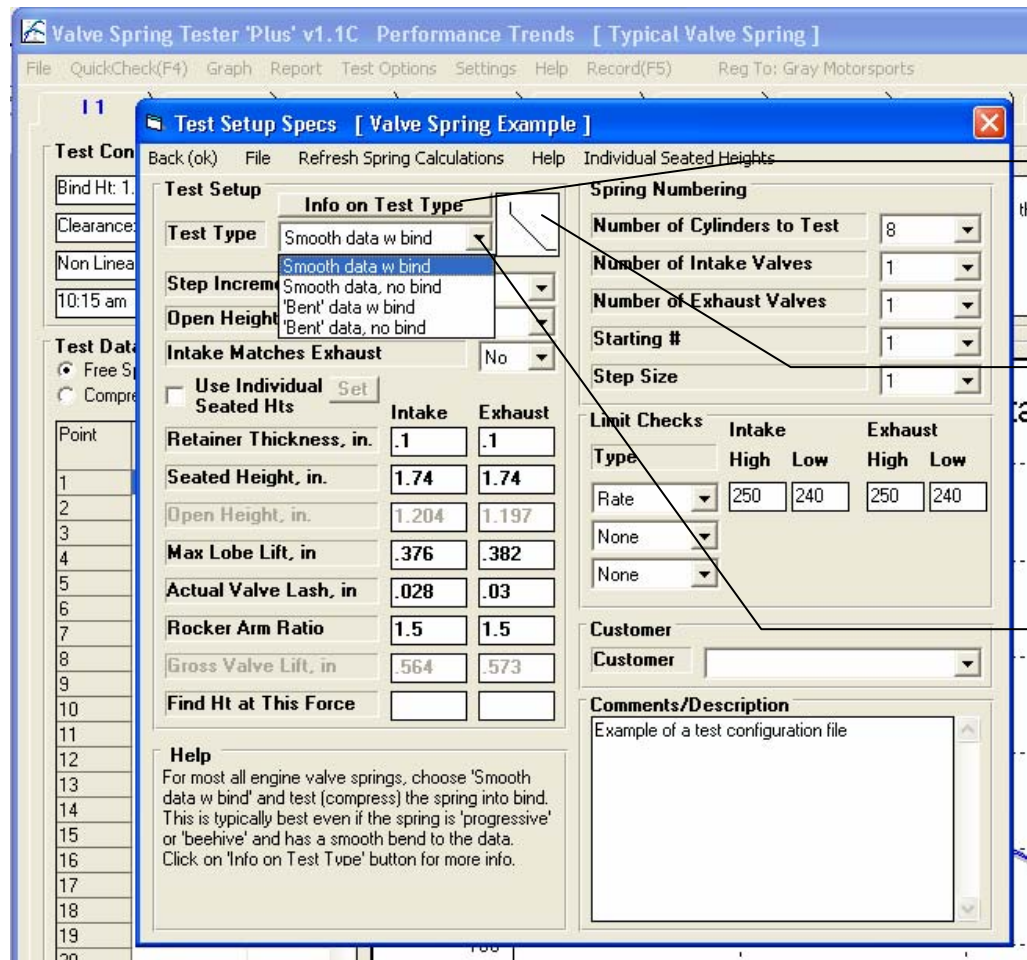
**C:\Users\Public\Public Documents\Performance-Trends-Data\Valve-Spring-Tester-Files**

In version 1.1C (and later versions of 1.1 B) we went back to storing them in the same folder as the Spring Tester folder. The change produced more problems than it fixed. The program should sense if data was stored in this location and automatically fix it so you don't have to do anything special.

There is a Preference setting "Show if Calibrations Match" where you can have the program point out that the critical calibration numbers used for measuring a spring (from the MASTER TESTER SPECS) are different from those currently loaded in the current test on the main screen. Setting to something other than 'No' (the previous stancard method) can help remove confusion on why tested results are being measured as they are. Fig A22 and 29.

There are now several "how to" videos on the Performance Trends website on operating the software and calibrating the tester. We also have the movies on our youtube channel, which may display the movies better depending on your browser and computer: To find it, google the key words: youtube performance trends . Fig A30.

Figure A17 Test Type Setting to Accommodate Different Types of Springs



Click on this button for screens below explaining the Types.

Picture graph of what this type of test expects for the raw data.

3 new Test Types to choose from. The first choice "Smooth data w bind" is the default, original method before these 3 new Types were added.

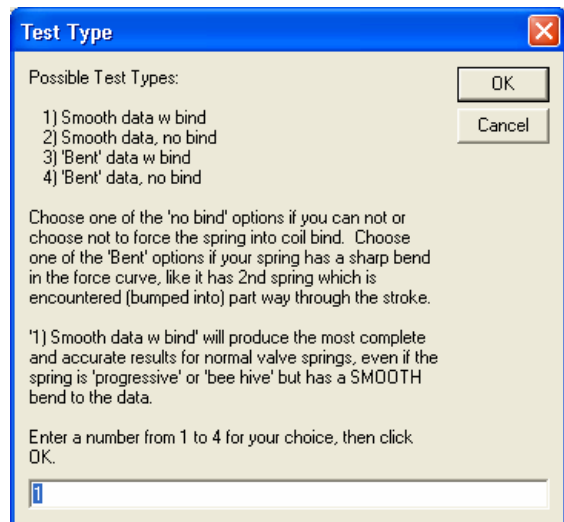
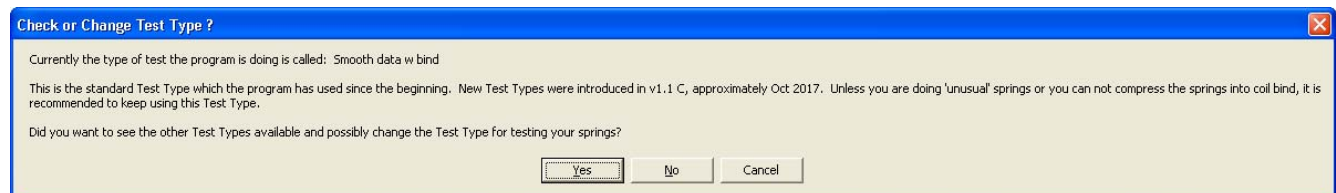


Figure A18 Setting Individual Spring Seated Heights

**Preferences**

Printing / Graphing  
General Operation  
File Options  
Operations, cont

Slow Down Data Readings: Yes, some  
Warn About Slowing Down Readings: Yes  
Com (serial) Port Baud Rate: 9600  
Typical Spring Size: Large, automotive  
Units: English (lbs, in, lb/in, etc.)  
Metric Force Units: Newtons nt  
Include Damping in Reports: No  
Auto Tester has High Force Option: No  
Use Linear Adjustment Factor: No  
Allow Individual Seated Heights: Yes  
Ask about errors when they happen: No

OK  
Cancel  
Restart Showing Help Tips  
Turn Off Help Tips  
Help

**Test Setup Specs [ Valve Spring Example ]**

Back (ok) File Refresh Spring Calculations Help Individual Se

Test Setup  
Info on Test Type

Test Type: Smooth data w bind  
Step Increment: .050"  
Open Height: Calc from Tappet Lift  
Intake Matches Exhaust: No  
 Use Individual Seated Hts  
Retainer Thickness: [ ]  
Seated Height, in: 1.74 1.74  
Open Height, in: 1.204 1.197  
Max Lobe Lift, in: .376 .382  
Actual Valve Lash, in: .028 .03  
Rocker Arm Ratio: 1.5 1.5

Spring Num  
Number of  
Number of  
Number of  
Starting #  
Step Size  
Type  
Rate  
None  
None  
Customer  
Customer  
Comments  
Example of

Set Individual Seated Heights  
Info on Individual Seated Heights

New options now visible in Test Options screen. Check 'Use Individual Seated Hts' to enable the "Set" button.

Set this to Yes, then click OK in upper right.

Click "Set" button for these options.

**Individual Seated Hts**

Set All Intake Heights  
Set All Exhaust Heights

Individual Seated Hts

Spring: E 1 St Ht = 1.74

Seated Height, in: 1.748  
E 1 St Ht = 1.74  
I 2 St Ht = 1.74  
E 2 St Ht = 1.74  
I 3 St Ht = 1.74  
E 3 St Ht = 1.74  
I 4 St Ht = 1.74  
E 4 St Ht = 1.74

Notes:  
Choose the 'Spring' for setting each 'Seated Height', then click on the 'Keep' button. Then when you click on the list of Springs, you should see that 'Seated Height' assigned to that Spring. Click on one of the 'Set all' buttons at the top to set heights for several springs at once.

Keep Heights Help Cancel Print

Screen to Set Individual Seated Heights

Click one of the "See All..." buttons to set the height of several springs to the same number. Heights not set typically default to Seated Height set in Test Options screen.

Choose a particular spring from this list.

Enter the Seated Height for this spring, then click the Keep button.

Now you will see the Height you set assigned to that spring in the list.

Figure A19 Setting Individual Spring Seated Heights in Recording Screen

You can also change the Seated Height in the Recording Screen. Note that when you change it, the Open Ht changes also to keep the valve lift the same.

Seated Ht was changed .003 and so the program changed Open Ht .003 also.

Valve Spring Tester 'Plus' v1.1C [ Typical Valve Spring 4 cyl ]

Back Print Report Types File History Log Help

Comments

Test Time: 10:15 am  
Date: 02/24/2003

Open Ht Int: 1.204  
Exh: 1.197

Seated Ht: 1.740  
Exh: 1.740

Retainer: .100

Ht for: 140. lb  
Exh: 144. lb

Report of: Standard Data Report  
Operator: Jack  
Errors: 8 springs

Cylinder	Spring Rate	Open Force	Open Height	Seated Force	Seated Height	Non Linear %	Bind Ht	Clearance	Ht for Force
Int #1	215.3 <	141.8	1.209	26.4	1.745	11.0	-.100	1.309	1.216
Exh #1	216.9 <	142.3	1.210	24.5	1.753	10.7	-.100	1.310	1.205
Int #2	217.6 <	141.7	1.212	25.1	1.748	9.7	-.100	1.312	1.218
Exh #2	218.7 <	143.6	1.205	24.9	1.748	9.7	-.100	1.305	1.205
Int #3	213.3 <	144.2	1.202	29.9	1.738	12.9	-.100	1.302	1.218
Exh #3	223.0 <	143.7	1.207	22.7	1.750	7.5	-.100	1.307	1.207
Int #4	215.5 <	143.8	1.205	28.3	1.741	12.9	-.100	1.305	1.218
Exh #4	215.1 <	144.8	1.203	27.9	1.746	12.3	-.100	1.303	1.208
Int. Maximum	217.6	144.2	1.212	29.9	1.748	12.9	-.100	1.312	1.218
Int. Minimum	213.3	141.7	1.202	25.1	1.738	9.7	-.100	1.302	1.216
Int. Spread	4.3	2.5	.010	4.8	.010	3.2	.000	.010	.002
Int. Average	215.4	142.9	1.207	27.4	1.743	11.6	-.100	1.307	1.218
Exh. Maximum	223.0	144.8	1.210	27.9	1.753	12.3	-.100	1.310	1.208
Exh. Minimum	215.1	142.3	1.203	22.7	1.746	7.5	-.100	1.303	1.205
Exh. Spread	7.9	2.5	.007	5.2	.007	4.8	.000	.007	.003
Exh. Average	218.4	143.6	1.206	25.0	1.749	10.1	-.100	1.306	1.206

Report when using Individual Seated Hts. Note that each Seated Height can be different.

Figure A20 Adjusting the Linear Sensor Calibration

Critical Spring Specs and Results		Forces	
Retainer	Seated Ht	1.745	26.4
1	Open Ht	1.209	141.8
Clearance	Bind Ht	Rate	Non-Lin. %
1.309"	~.100"	215.3 < lb/in	11.0

**Proceed to Adjusting/Checking the Length Sensor?**

To quickly adjust or check the length sensor, you will need to install a known standard (something solid of an EXACTLY known height). Do you want to continue with this process?

**Spring Tester**

Install a known height standard into the spring tester. Click OK when ready.

**Spring Tester**

Click OK when tester is firmly squeezing the 'Height Standard', perhaps 50-100 lbs of force.

**Enter Height for Standard**

Enter the height of the standard in the tester.

**Change Linear Offset?**

The standard height was measured to be:  
2.0107

And you have said it should measure:  
2.0000

The difference is:  
-.0107

Which will permanently change the linear sensor Offset:  
From: .6292 To: .6185

Do you want to make this change?

Choose No if you just want to check the calibration. If this screen shows a large difference, say .020" or more, run this check again, perhaps with a different height standard. If the 2<sup>nd</sup> check shows a similar difference, then answer Yes or check to see why the calibration could have changed (sensor moved).

**IMPORTANT:** Do NOT change the calibration unless you think the length sensor could have moved. Constantly adjusting the calibration will make your measurements LESS repeatable.



Figure A21 New Report Options and Types

**Report Options**

**Report Specs**

Type: Heights for Forces

Spring To Report: Intake & Exhaust

Force Increment: 10

**Notes:**  
 Select the type of report to make, then click on the Make Report button. Towards the bottom of the list you will see options for Comparison Reports, to compare one set of springs with one or more sets of springs (other test files). You will pick the tests for comparison by clicking on 'History Log' at the top of the Report Screen.

Buttons: Make Report, Help, Cancel, Print

Callout 1: New Report Type of "Heights for Forces"

Callout 2: Separate setting for what springs to include in the report.

Callout 3: For the Report Type of "Heights for Forces", this Force Increment will appear. Enter the number for the increments you want. Note: There is a limit to the number of lines which can be in the report. If you choose a small increment, the report may not cover the entire range of the spring's force curve.

Callout 4: Report created from settings shown, and for the range of force data between the Seated Height and Open Height.

Valve Spring Tester 'Plus' v1.1C [ Typical Valve Spring ]

Back Print Report Types File History Log Help

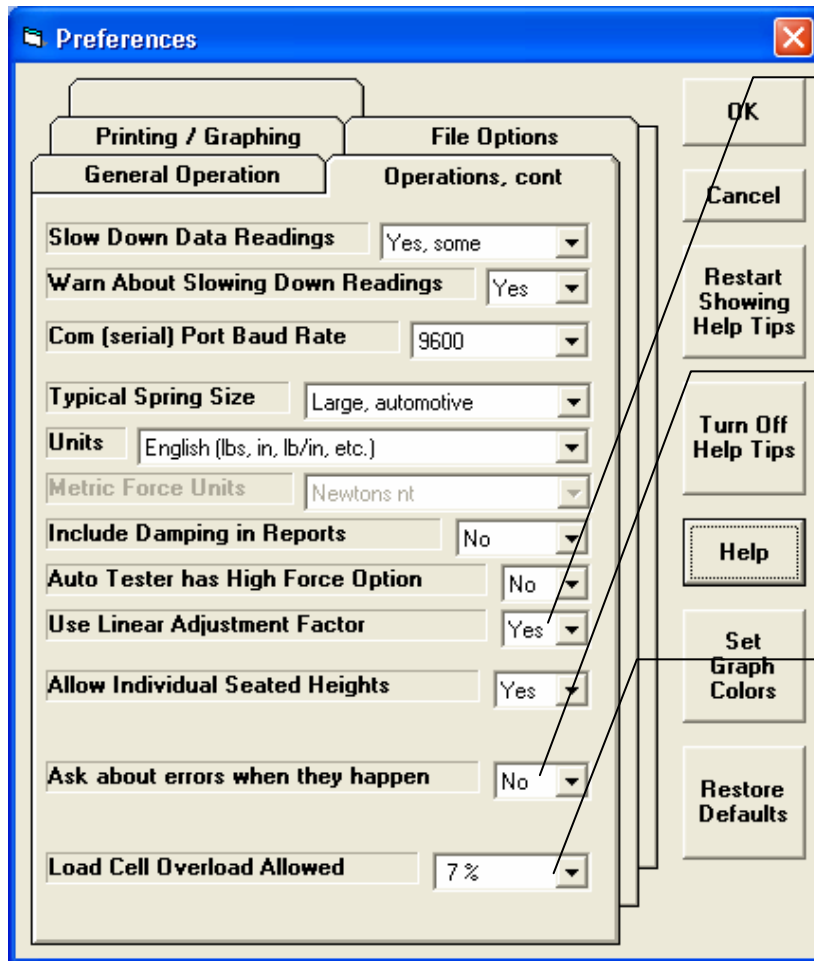
Comments

Test Time: 10:15 am  
 Open Ht: 1.204  
 Seated Ht: 1.740  
 Retainer: .100  
 Ht for: 240. lb  
 Report of: Heights for Forces  
 Operator: Jack  
 Errors: 16 springs

Force, lb	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8
140. Int	1.215	1.217	1.216	1.216	1.223	1.215	1.221	1.223
130. Int	1.249	1.252	1.249	1.249	1.257	1.246	1.254	1.256
120. Int	1.284	1.287	1.284	1.283	1.292	1.279	1.288	1.291
110. Int	1.321	1.325	1.320	1.319	1.329	1.314	1.325	1.327
100. Int	1.359	1.363	1.358	1.356	1.367	1.352	1.363	1.365
90. Int	1.399	1.404	1.398	1.396	1.407	1.392	1.403	1.405
80. Int	1.442	1.447	1.441	1.439	1.450	1.435	1.446	1.448
70. Int	1.487	1.493	1.488	1.486	1.497	1.482	1.493	1.495
60. Int	1.536	1.542	1.539	1.536	1.547	1.532	1.543	1.545
50. Int	1.590	1.595	1.595	1.593	1.604	1.589	1.600	1.602
40. Int	1.649	1.654	1.659	1.660	1.661	1.679	1.657	1.658
30. Int	1.718	1.720	1.737		1.730		1.731	1.729
140. Exh	1.217	1.218	1.219	1.219	1.217	1.220	1.223	1.224
130. Exh	1.251	1.252	1.255	1.252	1.249	1.255	1.258	1.257
120. Exh	1.286	1.288	1.292	1.287	1.283	1.291	1.294	1.291
110. Exh	1.323	1.325	1.330	1.323	1.319	1.329	1.331	1.327
100. Exh	1.361	1.364	1.370	1.362	1.357	1.368	1.370	1.365
90. Exh	1.401	1.404	1.411	1.402	1.397	1.409	1.411	1.405
80. Exh	1.443	1.447	1.454	1.445	1.440	1.452	1.453	1.447
70. Exh	1.489	1.493	1.500	1.491	1.486	1.497	1.498	1.493
60. Exh	1.538	1.541	1.548	1.540	1.537	1.546	1.546	1.543
50. Exh	1.591	1.593	1.599	1.595	1.593	1.598	1.597	1.597
40. Exh	1.650	1.649	1.654	1.657	1.659	1.654	1.652	1.660
30. Exh	1.717	1.713	1.715	1.729	1.739	1.717	1.713	1.733

Callout: Some values may not be given, because in this case there was no data available because the Seated Height produces more than 30 lbs.

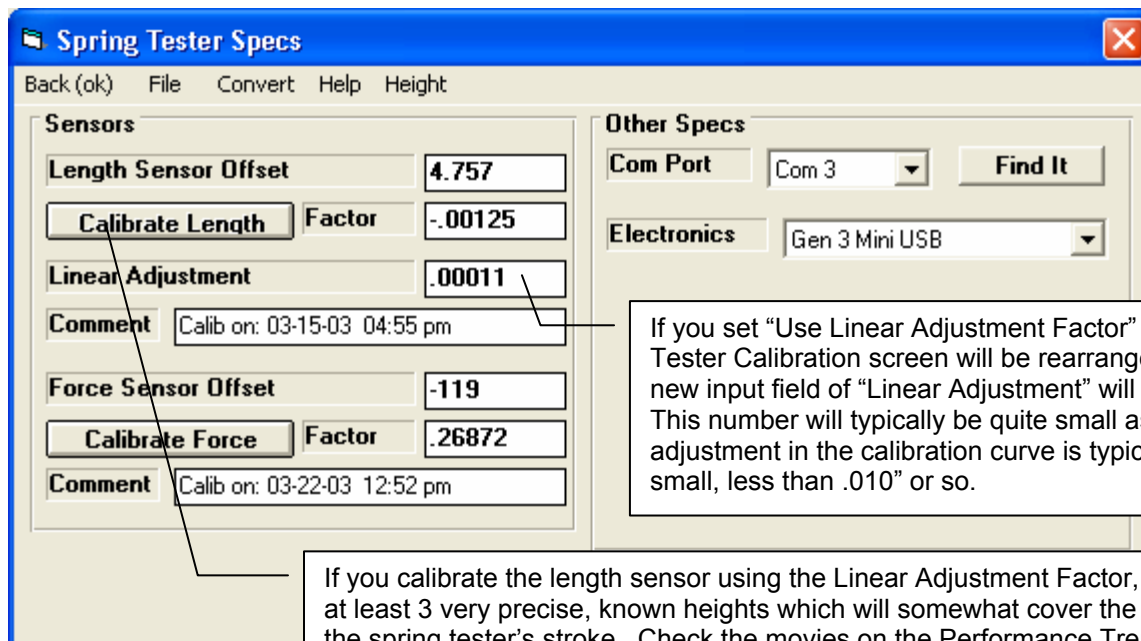
Figure A22 New Preference Options, including Use Linear Adjustment Factor



Set to Yes to do a more precise calibration of the length sensor. If you set this to Yes, you must be VERY careful and precise when you recalibrate the length sensor. If not you will likely produce a LESS accurate calibration and results.

The default or standard setting is Yes, which will produce some of the error messages shown in Fig A23 on the next page. If you set this to No, you will avoid all the messages, but may not know about some problem with your settings.

This can be set to something higher than 0% if you are encountering "excessive force" errors when compressing a spring into bind. However, if you set this to something higher than 0%, you risk over-ranging and damaging the load cell.



If you set "Use Linear Adjustment Factor" to Yes, the Tester Calibration screen will be rearranged and a new input field of "Linear Adjustment" will appear. This number will typically be quite small as the adjustment in the calibration curve is typically quite small, less than .010" or so.

If you calibrate the length sensor using the Linear Adjustment Factor, you will need at least 3 very precise, known heights which will somewhat cover the entire range of the spring tester's stroke. Check the movies on the Performance Trends website under Support for info on this procedure.

## Figure A23 Preference to Turn Off Error Messages for Calculations

Here are some of the error messages and questions the program will display if you enter a Seated Height or Open Height which is not within the spring's range of travel. Check Fig A22 for the Preference setting which can avoid these messages.

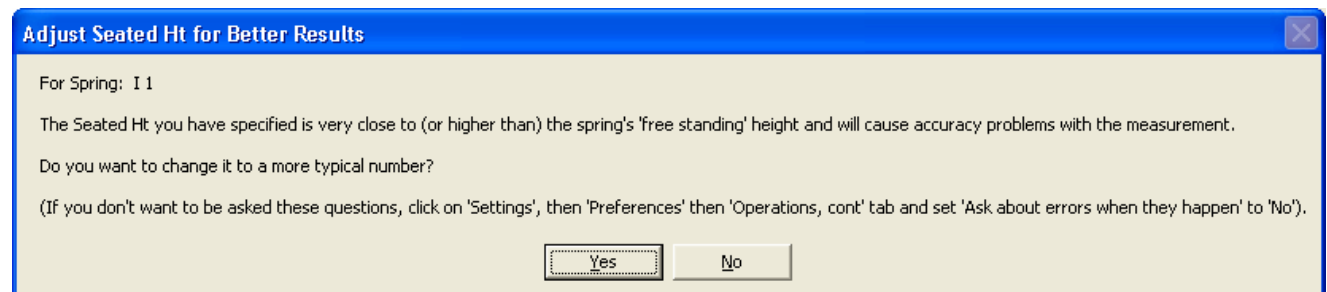
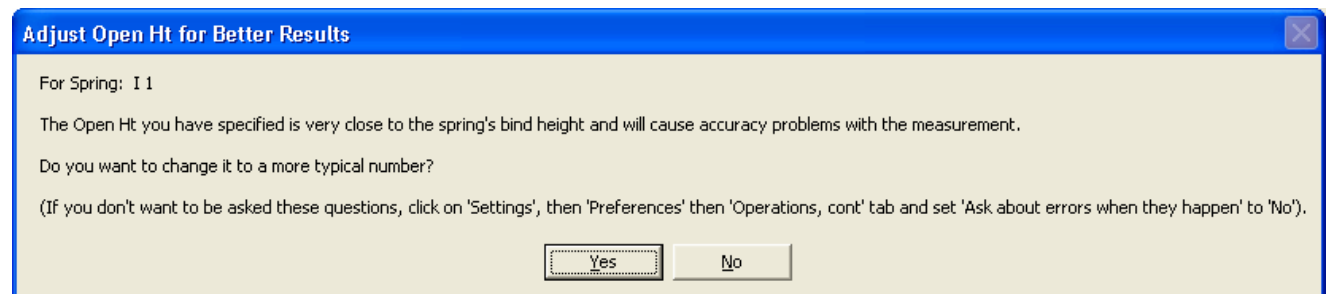
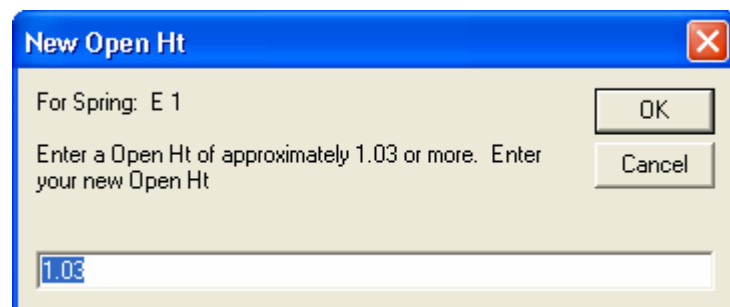
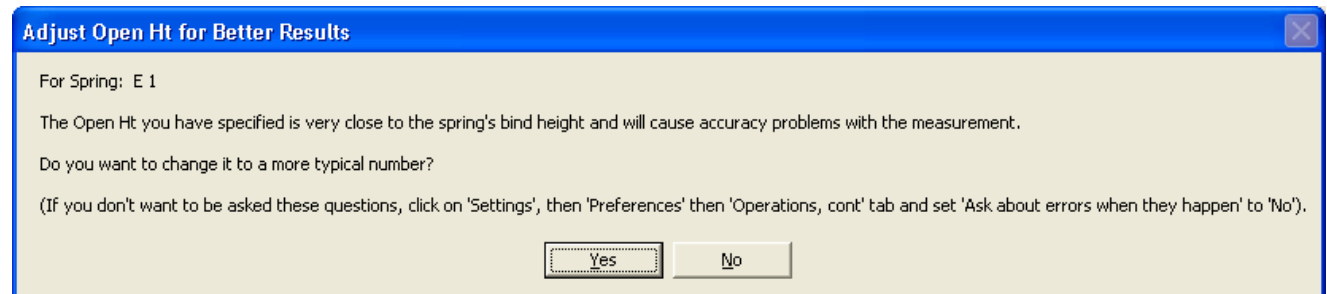


Figure A24 New Features for Starting a New Test

The screenshot shows a dialog box titled "Starting a New Test" with a blue header and a close button (X) in the top right. The main area has a light beige background. At the top, there are three buttons: "Start New Test", "Cancel (don't start new test)", and "Help". Below these are three input fields: "File Name for New Test" containing "Ron James", "Operator for New Test" containing "Jack", and "Folder Name for New Test" containing "a33 kevin". The "Folder Name" field has a dropdown arrow. A "Pick" button is located between the "Operator" and "Folder Name" fields, and an "Add" button is to the right of the "Folder Name" field. Below the input fields is a section titled "Pick Which Specs to Keep, based on current file [ Ron James ]". It contains three checked items: "Tester" with a "See Specs" button and the text "Type: Ref. Trends' Gen. 2 USB Logger on Com 3"; "Test Options" with a "See Specs" button and the text "If you want to record the same data as the current test, keep this box checked. Click 'See Specs' but"; and "Test Comments" with the text "Check this box if you want to keep the Test Comments and make some minor changes for the New Test." Below this is a text area containing an example: "Example of 16 stock 5.0L Mustang valve springs Limits in the Test Options will flag out spring rates which fall outside the range of 240 to 250 lbs/inch. Note that Exh #2 is too high, at 250.1 lb/in". At the bottom, there is a note: "Once a New Test is started, you can easily erase or modify any of the specs listed above. Any specs not selected to 'Keep' will be mostly blank when you start the New Test." A callout box points to the "File Name" and "Folder Name" fields with the text "Larger fields for test file and folder names."

The screenshot shows a dialog box titled "Use File Name: Ron James001 ?" with a blue header and a close button (X) in the top right. The main area has a light beige background. On the left is a yellow warning icon. The text reads: "To make sorting through file names in the future easier, the program suggests using the file name of: Ron James001 rather than the file name you entered of: Ron James. Is it OK to change the file name to the suggested name?". At the bottom are "Yes" and "No" buttons. A callout box points to the "No" button with the text: "If you start a new test without numbers at the end of the name, the program will suggest a name with 3 digits for numbers at the end of the name. Using 3 digits will make the tests list out better alphabetically."

The screenshot shows a dialog box titled "Valve Spring Tester 'Plus' v1.1C Tip" with a blue header. The main area has a light beige background. The text reads: "Note: Because you are closing this 'Starting a New Test' screen without starting a new test, any changes you have made in this screen will be abandoned. This ensures the settings for the current test on the main screen will not be changed or corrupted." At the bottom are "Don't show this again" (with a checkbox), "OK", and "Help" buttons. A callout box points to the dialog with the text: "Message you will get if you Cancel out of starting a New Test."

Figure A25 New Features Deleting, Adding, etc Files and Folders

These features are available when you click on File, then Open (from all saved tests) on the main screen.

The screenshot shows the main application window with the 'File' menu open. The 'Open (from all saved tests)' option is highlighted. Below it, the 'Open Test File' dialog box is displayed. The dialog has a list of folders under '2 Tests in Library' containing 'junk' and 'junk1'. A 'Chosen File:' field is empty. At the bottom, there are buttons for 'Open', 'Filter', 'Advanced', 'Cancel', 'Help', and 'Delete'. A 'Folders' list on the right shows 'junk' selected, with a context menu open showing options like 'Delete', 'Add New', 'Make Copy (or Merge)', 'Rename', and 'Close This Menu'. A tip box explains that a single click chooses a test for preview, while a double click opens it immediately.

Right click on a folder in the list for the list of options to appear as shown below, or click the Delete or Add button.

**Delete junk**

Permanently Delete the Entire Folder called junk, containing 2 test ?

If you just want to delete 1 test (not 2 tests), click on NO. Then pick the single test from the list of files in the upper left corner of this screen, and click the other Delete button below the file list.

**Delete junk**

Note: This will delete ALL 2 TESTs contained in this Folder . (Actually it will be sent to the Recycle Bin so it could be restored later if needed.)

If you are not sure, click on No now.

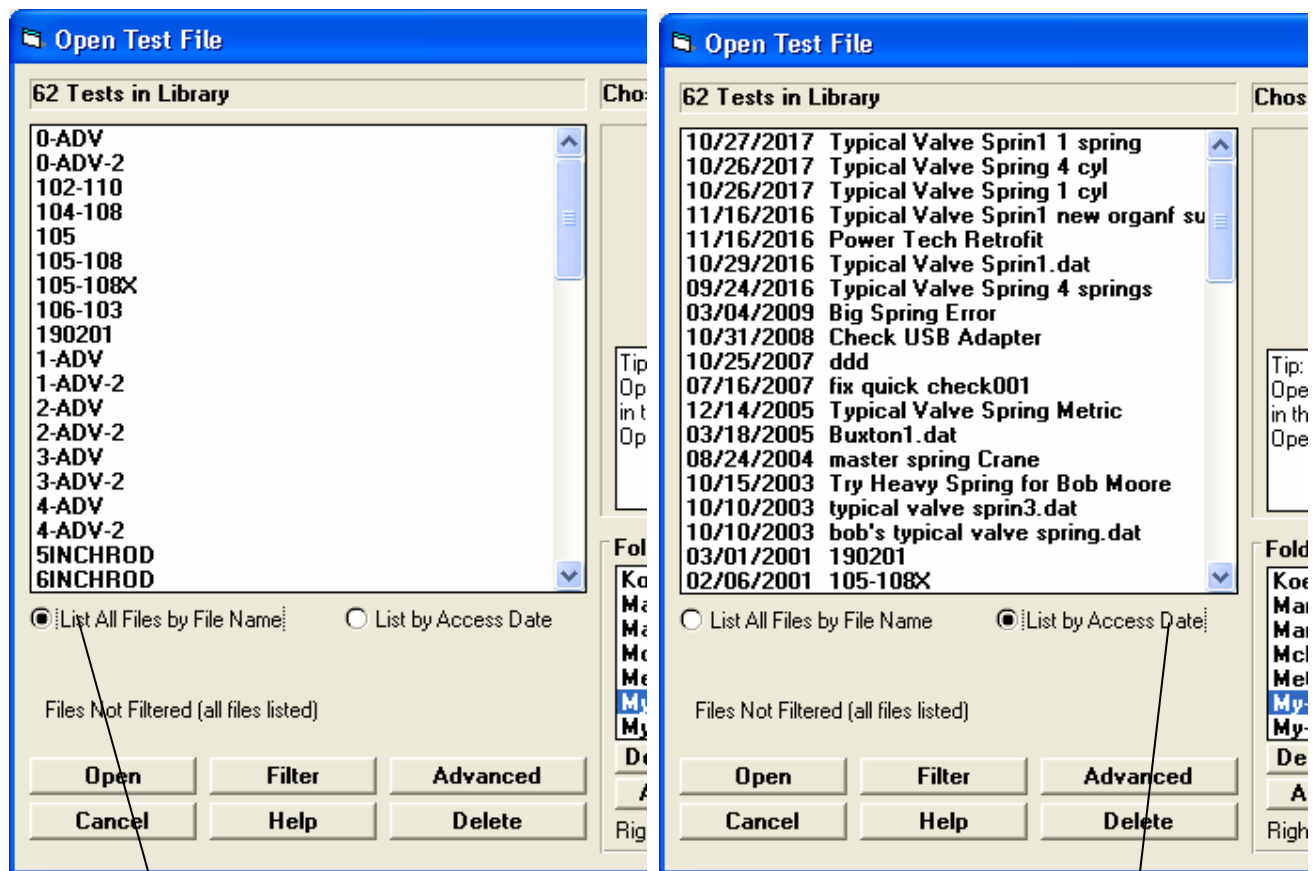
Do you want to continue Deleting Folder junk ?

**Confirm Folder Delete**

Are you sure you want to remove the folder 'junk' and move all its contents to the Recycle Bin?

Folders and test files you delete are now sent to your computer's Recycle Bin, so they can be recovered if need be.

Figure A26 New Feature for Listing Files by Date



The typical method for listing files is alphabetically as shown here.

The new method available is to list them by the last date the files were "accessed" or opened. This may not be the date of the test. For example if you ran the test in July, but opened the test in September, the test will be listed by the September date.

Figure A27 New Features for Filtering (finding) Test Files

**Open Test File**

9 Tests of 96 Fit Filter Specs

usb logger best mods + firmware  
 usb logger best mods with better linear pot 001  
 usb logger best mods with better linear pot 002  
 usb logger best mods with better linear pot 003  
 usb logger best mods with better linear pot 004  
 usb logger v1.05 check repeat  
 usb logger v1.05 check repeat1  
 usb logger w analog amp 001  
 usb logger wo R26

List All Files by File Name

Files Filtered (all files not listed) Click on Filter to list all files.

Open Filter Advanced  
 Cancel Help Delete

**Filter Files**

List Files If ...  
 This comment or spec: File Name  
 Has this relationship: Contains  
 To what I entered here: gg

List Files If ...  
 And  Or  Include this condition also

Show only files fitting these conditions  
 Turn Off Filtering (show all files)  
 Print list of all files fitting these conditions  
 Help

Note: Filtered lists will not include v2.1 files. Click on Help for more info.

Callouts:  
 - Filtered file names, showing only files with a "gg" in the file name. The title at the top says only 9 tests of the 96 tests in this folder meet this criteria.  
 - You can now search for phrases or characters in the test File Name. In the case below, we'll be looking for all file names with a "gg" in the name. See page 67 in this manual for more info on Filtering.  
 - Click Filter button to bring up screen shown to the right.  
 - Click here for the screen at the upper left.  
 - Click here to turn Filtering OFF and show all files. See page 67 in this manual for more info.

**Filtered.txt - Notepad**

Folder	Test
black box	usb logger best mods + firmware
black box	usb logger best mods with better linear pot 001
black box	usb logger best mods with better linear pot 002
black box	usb logger best mods with better linear pot 003
black box	usb logger best mods with better linear pot 004
black box	usb logger v1.05 check repeat
black box	usb logger v1.05 check repeat1
black box	usb logger w analog amp 001
black box	usb logger wo R26
My-Tests Full Boar	Haggerty
My-Tests Full Boar	Haggerty2
My-Tests Full Boar	Haggerty3
My-Tests Full Boar	Haggerty3-kev
PRI 2005	Briggs.dat
Sanborn	Haggerty2.txt
Sanborn	Haggerty3.txt
USB Logger	Try USB Logger
USB Logger	Try USB Logger -Mini BB Cal
USB Logger	Try USB Logger -Mini BB Cal + USB Logge1
USB Logger	Try USB Logger -Mini BB Cal + USB Logger
USB Logger	USB Lggr 1.04 w Dif Caps Rests
USB Logger	USB Lggr 1.04 w Dif Caps Rests #2
USB Logger	usb logger best mods + firm compare
USB Logger	usb logger best mods + firm compare 2
USB Logger	USB Logger Best Mods Repeats
USB Logger	usb logger best mods with better linear pot
USB Logger	usb logger w analog amp
USB Logger	usb logger w analog amp 001
USB Logger	usb logger w analog amp new-old firmware

Ln 1, Col 1

Callout: Click here to obtain a screen as shown to the lower left, a list of all file names and folders where the test name contains a "gg".

Figure A28 New Graph Title on Main Screen Summarizing Results

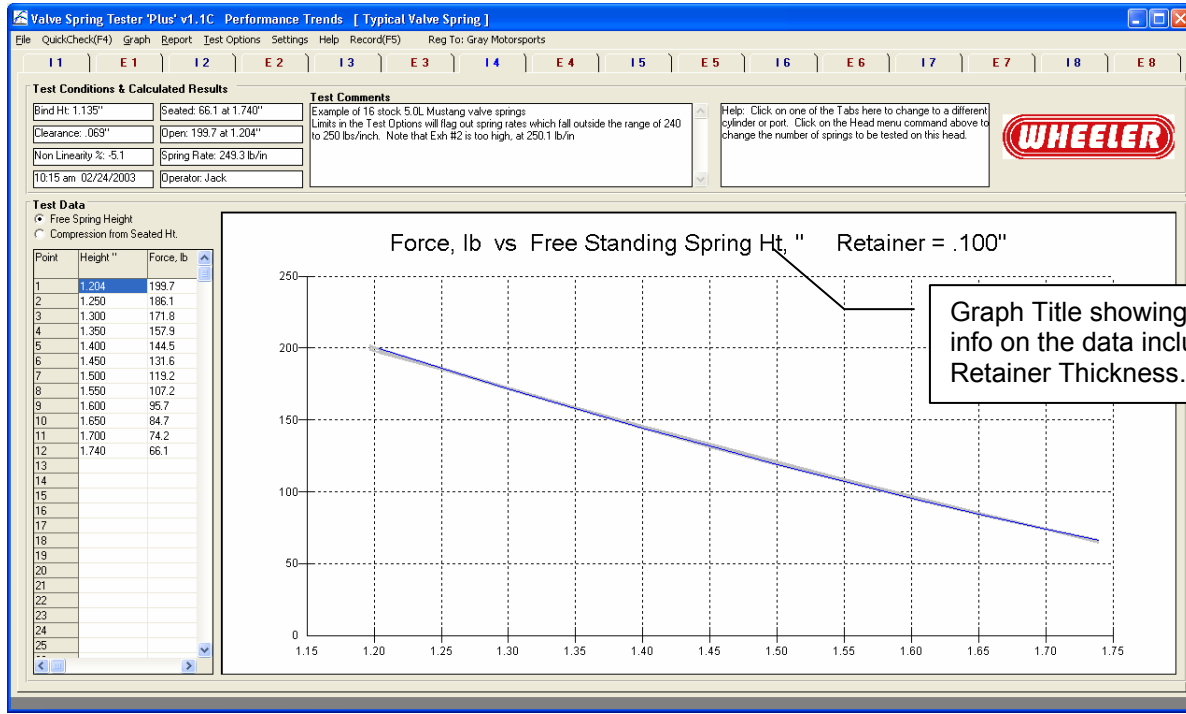


Figure A29 New Feature Showing if Tester Calibration of Current Test does not Match Calibration of Master Tester Specs

**Calibration Numbers Not Matching**

Note on calibration numbers:

Length Offset (current test file) = 4.757 Master Specs (being used) = .6292  
 Length Factor (current test file) = -.00125 Master Specs (being used) = .000764  
 Force Offset (current test file) = -119 Master Specs (being used) = 0  
 Force Factor (current test file) = .26872 Master Specs (being used) = .1586

This usually happens when you've opened up an old test with different calibration numbers than the current 'Master' Tester Specs, the spec representing your tester's latest settings which should be the most accurate.

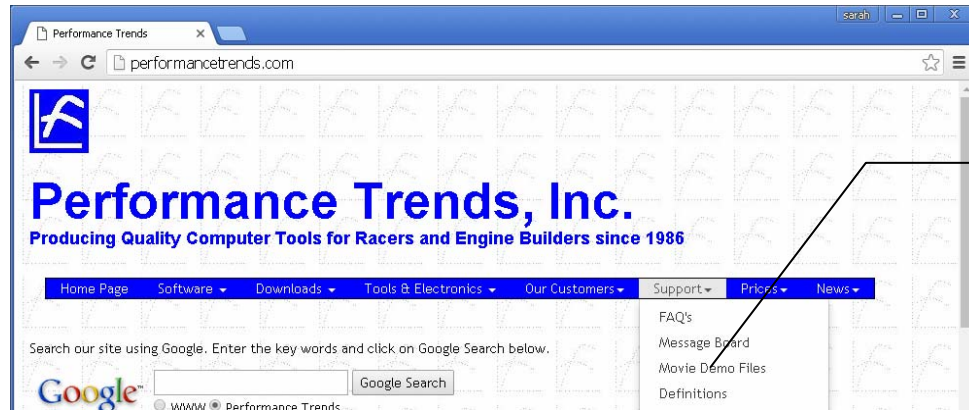
The Master numbers are being used for the data displayed on the screen now, and any new data you record.

If this notice is a bother, it can be turned off by choosing 'Yes' below. This notice can be turned on again in the future in Preferences under the 'Operation' tab.

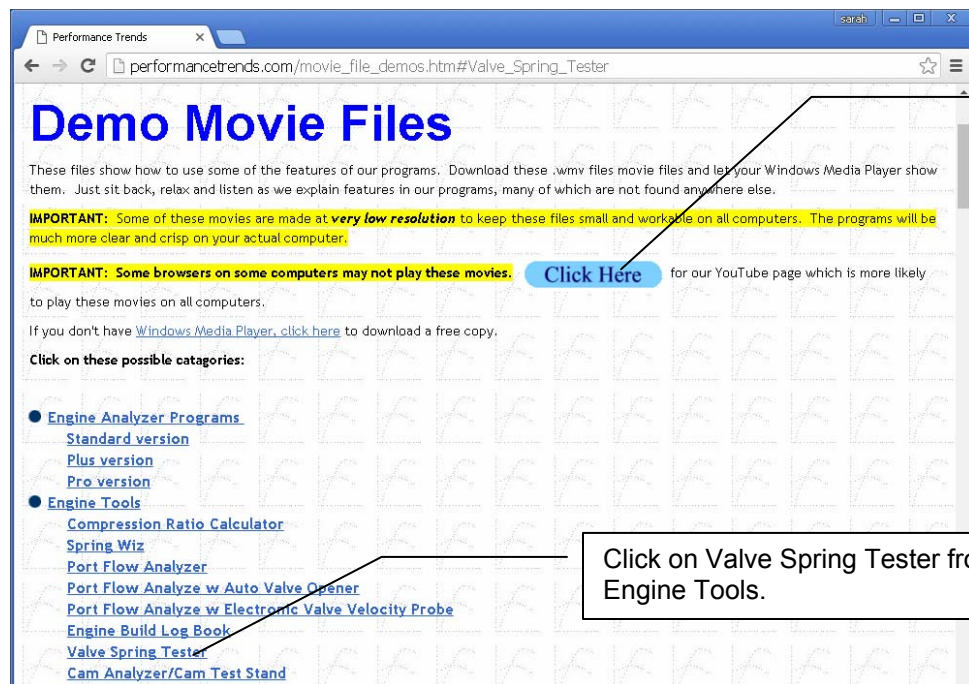
Do you want to turn off this notice from now on?



Figure A30 Video Movies to Demo the Spring Tester Features



At the Performance Trends website, click on Support, then Movie Demo Files.



If these movies do not show up correctly on your particular computer, click this button to go to the Performance Trends youtube page. The movies on youtube will likely play correctly on most any computer.

Click on Valve Spring Tester from the list of Engine Tools.

Choose from the list of Valve Spring Tester movies.

