

Appendix 12: New Features in v 3.9 Enterprise Edition

The Enterprise Edition of Engine Analyzer Pro has some very advanced features the typical user would not use. These include:

- You can use a full compressor map to define the performance of a turbocharger compressor. Figs A57 and A58.
- You can specify a particular turbocharger boost level, intake manifold temperature (after the turbocharger compressor), and exhaust backpressure level. This gives you more freedom to simulate some particular situation which may be difficult to simulate using the turbocharger compressor and turbine model specs in the program. Fig A59.
- You can view the compressor map when calculations are being performed to see what area of the map is being used. Fig A60.
- You can use a full compressor map to define the performance of a centrifugal supercharger compressor. Figs A61 and A62.
- You can design a system where a centrifugal supercharger feeds into a roots blower supercharger. Fig A63.
- You can interface to the Compression Ratio Calculator program and transfer data back and forth between them. Figs A64 through A67.
- You can run a part throttle performance “map”. This map can be useful for calibrating electronic engine controllers, or just understanding part throttle performance. Fig A68 and A69.
- There is a new Preference which lets you choose a different language for certain labels in the program. Fig A70.
- Two new Preferences are provided to adjust the valve train dynamics calculations. One allows you to increase the stiffness of the lifter/cam interface. The other allows you to increase the stiffness of the rocker arm for Overhead Rocker Arm styles of valve trains. The factor you pick is multiplied by the default stiffness. For example, if you pick 1.5, the default stiffness is increased 50%. Fig A70.
- A Preference has been added to allow for adjusting intake runner wall friction for the Intake Runner and Port. The program picks a certain amount of wall friction based on manifold type, Runner Flow Coef, etc. Your choice here will change it by the percentage you pick. Fig A70.
- A Preference has been added to let you adjust how much valve toss (separation between follower and cam) will be called Valve Toss in the tabular results. The default used by the program for many years is “.020”. If the program sees more than “.020” separation between cam lobe and follower, it is flagged as Valve Toss in the calculated results. Your choices will let you pick a certain percentage of the lobe’s maximum lift. Fig A70.

Figure A57 Using a Full Compressor Map for Turbochargers

1st Stage Turbocharger Specs

Surge CFM: 180
Exh Turbine Eff, %: 65% Typical
Turbine Nozzle Dia, in: 1.1

General Turbocharger Specs

Throttle Location: Draw Through
Max Boost Limit, PSI: 10
Turbos/Stages: 1 Single Turbo
Intercooler Eff, %: 0% No Intercooler
Intercooler CFM Rating: 100000
Wastegate Is...: Before Intercooler

Force to Boost Conditions

Boost, psi: [] Int Temp: [] Exh Pres: []
Force These Conditions: No

Full Compressor Map

Use Compressor Map: Yes File: @C:\WB98\projects6\EAAPROX\CENTMAP\Gar View

Comments

Approximate specs for single Rajay 300F trim with 10 psi limit on wastegate.

Help

CFM where the surge line intersects pressure ratio of 2.0. p 59

Callouts:

- Note that some specs are not needed when you choose to use a Map.
- Current Map File Name
- Click on View for screen below, to enter, open or edit Map settings.
- Set to Yes and then you can choose a Map File to describe the turbocharger compressor.

Pressure Ratio Range (rows)

Highest Pressure Ratio: 5.00
Pres. Ratio Step Size: 0.125
Preview: 1.00, 1.13, 1.25, ... 5.00

CFM Flow Range (columns)

Highest CFM: 290
CFM Step Size: 14.524
Preview: 15, 29, 44, ... 290

Surge CFM: 35
Update Graph
Print Table

Pres Ratio	15	29	44	58	73	87
1.00 Eff%	45	45	50	50	50	50
1.13 Eff%	48	50	55	55	55	55
1.25 Eff%	50	55	60	65	65	62
1.38 Eff%	55	60	65	65	68	68
1.50 Eff%	55	60	65	68	70	73
1.63 Eff%	55	60	65	68	71	74
1.75 Eff%	55	60	65	68	71	74
1.88 Eff%	55	65	65	68	70	74
2.00 Eff%	55	60	65	68	69	72
2.13 Eff%	55	60	65	65	68	72
2.25 Eff%	55	60	65	65	68	72
2.38 Eff%	55	60	65	65	68	71

Graph: A compressor map graph showing efficiency contours (80, 75, 70, 65, 60, 55, 50, 45 Eff%) plotted against Pressure Ratio (1.0 to 5.0) and CFM (0 to 305). A shaded region indicates the operating range.

Callouts:

- Choose settings which describe how large the Map will be and how many "cells" you have to fill in for the Map, the smaller the "Step Size", the more cells.
- Surge CFM is still used with Map and drawn on Map.
- The Graph is not automatically updated with each change you make. Click here to update the graph.
- Click on a grid cell to enter the Thermal Efficiency at that Pressure Ratio and CFM flow, then press <Enter> to advance to next cell.

Figure A58 More Compressor Map Features

The screenshot shows the 'S/C Map [Garrett GT1241 50 Trim.CMP]' window. It features several control panels: 'Pressure Ratio Range (rows)' with 'Highest Pressure Ratio' at 5.00 and 'Pres. Ratio Step Size' at 0.125; 'CFM Flow Range (columns)' with 'Highest CFM' at 290 and 'CFM Step Size' at 14.524; and a 'Surge CFM' field set to 35. There are 'Update Graph' and 'Print Table' buttons. A data table is displayed with columns for 'Pres Ratio' and values for 15, 29, 44, 58, 73, 87. The table rows represent efficiency percentages from 1.00 to 2.38. A file selection dialog is open, showing a list of files including 'Cent Map Nov 2012.CMP', 'Garrett GT1241 50 Trim.CMP', 'Garrett GT3582R 56 Trim.CMP', 'Turbonetics T04S-60-1.CMP', and 'Turbonetics T61.CMP'. At the bottom, there are buttons for 'Open This File', 'Cancel Open', 'OK (keep changes)', 'Cancel Changes', 'Save As (new name)', 'Open', and 'New (blank out)'.

Pres Ratio	15	29	44	58	73	87
1.00 Eff%	45	45	50	50	50	50
1.13 Eff%	48	50	55	55	55	55
1.25 Eff%	50	55	60	65	65	62
1.38 Eff%	55	60	65	65	68	68
1.50 Eff%	55	60	65	68	70	73
1.63 Eff%	55	60	65	68	71	74
1.75 Eff%	55	60	65	68	71	74
1.88 Eff%	55	65	65	68	70	74
2.00 Eff%	55	60	65	68	69	72
2.13 Eff%	55	60	65	65	68	72
2.25 Eff%	55	60	65	65	68	72
2.38 Eff%	55	60	65	65	68	71

Click on a saved Map file, then click on Open This File button to open it. Turbocharger Map files are saved in the CENTMAP folder with a ".CMP" file extension. Centrifugal Supercharger Map files are saved in the same folder with a .CMC extension.

Click this Open button to display the list of saved files shown above.

Click here to save this Map to a new name.

Current Map file name. Note: A Map file is just the specs you see in this screen. It is just a part of the total Turbocharger component file.

Figure A59 User Specified Turbo Boost and Backpressure

The screenshot shows a dialog box titled "Turbocharger Specs for: RAJAY-30.0F". It contains several input fields and a "Clc" button. The "Force to Boost Conditions" section includes "Boost, psi" (100), "Int Temp" (411), and "Exh Pres" (85). A "Force These Conditions" dropdown is set to "Yes". A "Comments" text area contains the text: "Approximate specs for single Rajay 300F trim with 10 psi limit on wastegate." A "Help" section provides instructions: "Enter the Intake Boost Pressure you want the program to force into this intake manifold. The program will produce much more or less boost than this." Buttons at the bottom include "OK", "Help", "Retrieve from Library", and "Save".

Exhaust pressure is typically close to the Boost pressure. In a very efficient, turbo which is well matched to the engine, the exhaust pressure can be less than boost pressure. In an inefficient system, exhaust pressure will be higher. If you are not sure, set this equal to Boost pressure.

Choose Yes and you can produce most any intake and exhaust conditions you want. You will notice that all other turbocharger settings are not shown to indicate they will have not affect on the results, just these 3 inputs.

The screenshot shows a dialog box titled "Calc Intake Temperature". It has three input fields: "Calc Intake Temperature, Deg F" (411), "Outside Air Temperature, Deg F" (77), and "Barometric Pres, inches HG" (29.66). Below these is an "Intake Conditions" section with "Boost Level, PSI" (100), "Turbo Efficiency" (70% Good), "Turbo Efficiency, %" (empty), "Intercooler" (Yes), and "Intercooler Effectiveness, %" (40). At the bottom are buttons for "Use Calc Value", "Help", "Cancel", and "Print".

Click on this Clc button for the screen to the left, where you can enter some inputs about the turbo system and get a good estimate of the Intake Air Temperature going into the engine after the turbocharger.

Figure A60 Watching the Compressor Map during Calculations

If you are using a Map file, this button will appear on the Progress Form. If you select to Show S/C Map, you have choices to show continuously or Pause at different steps.

For most situations, "Pause Each RPM" is a good choice.

Click mouse button down on the blue title bars of these small screens and **hold down** to grab these screens. While holding mouse button down, slide mouse to place where you want to see what you need.

Current conditions shown here as numbers and graphed on Map as dot.

Dots are shown for each intermediate step. Note that these dots top out at a pressure ratio of about 2.0 because of the Max Boost setting of 30" in the Turbocharger Specs screen.

At the end of each step, click on these new buttons to advance to the next step, print the Map, or go back to Continuous running.

Engine RPM	2000
Brk Tq, ft-lbs	342.4
Brake HP	130.4
Exh Pres, PSI	10.4
Boost, PSI	16.7
Vol Eff, %	155.7
Actual CFM	159
Fuel Flow, lb/hr	55.38
Nitrous, lb/hr	.00
Ntrs Fuel, lb/hr	.00
BMEP, PSI	293.50
A/F Mxtr Qty, %	100.0
BSFC, lb/HP-hr	4.25
Thermal Eff, %	33.20

Approx VEs: 107 111 112 118 124 128 132 136 140

Approx VEs: 152 161 171 180 176 168 166 168 171 174 174

Figure A61 Centrifugal Supercharger using Full Compressor Map

Centrifugal Supercharger Specs for: VORTECH-.S

Centrifugal Supercharger Specs

Island CFM: 650
Island Pressure Ratio: 1.55
Island Efficiency, %: 73
Island RPM: 33000
Internal Gear Ratio: 3.45
Belt Ratio: 3
Maximum Flow, CFM: 1625

Centrifugal Supercharger Specs, cont

Mech Friction: Typical Friction
Max Safe Impeller RPM: 55000

General Supercharger Specs

Throttle Location: Blow Through
Max Boost Limit, PSI: 100
Number of S/Cs: 1 Single S/C
Intercooler Eff, %: 0% No Intercooler
Intercooler CFM Rating: 100000

Full Compressor Map

Use Compressor Map: Yes
View

File: @C:\WB98\projects6\APPROX\CENTMAP\

Help: 'Speed up' gear ratio within blower, for example most Paxtons use 4.4, some Vortech's use 3.45. p.56

Comments: Single Vortech Centrifugal S/C V2-S trim with no intercooler and 1.75 belt ratio. Change intercooler and belt ratio specs to match your application.

Buttons: OK, Help, Retrieve from Library, Save to Library, Print

Callout 1: Click here to choose to use a full map. (points to 'Use Compressor Map')

Callout 2: Click here to bring up screen shown below (points to 'View')

Callout 3: Click here to show the RPM Graph. (points to 'OK')

S/C Map [Vortech V5 F trim.CMC]

Pressure Ratio Range (rows):
Highest Pressure Ratio: 2.6
Pres. Ratio Step Size: .2
Preview: 1.00, 1.20, 1.40, ... 2.60

CFM Flow Range (columns):
Highest CFM: 1000
CFM Step Size: 200
Preview: 200, 400, 600, ... 1000

Surge CFM: 250
Update Graph
Show RPM
Print Table

Pres Ratio	200	400	600	800	1000
1.00 RPM	5000	5000	5000	5000	5000
1.00 Eff%	10	20	20	10	10
1.20 RPM	26000	31000	39500	50000	80000
1.20 Eff%	70	60	38	28	10
1.40 RPM	35500	37500	43000	52000	70000
1.40 Eff%	67	75	61	40	30
1.60 RPM	43500	43500	47500	53500	70000
1.60 Eff%	62	75	72	50	35
1.80 RPM	49000	48500	51500	55500	70000
1.80 Eff%	58	73	72	61	42
2.00 RPM	54500	53000	54000	59000	75000
2.00 Eff%	55	68	73	64	50
2.20 RPM	60000	56500	57500	62000	90000
2.20 Eff%	50	65	73	65	50

The Map is very similar to the Turbocharger Map except you also need an RPM to go with each Thermal Efficiency at each Pressure Ratio and CFM flow data point. For example, this point shows the blower is spinning at 49000 RPM and produces 58% efficiency at a Pressure Ratio of 1.80 at a CFM of 200.

Figure A62 Centrifugal Supercharger using Full Compressor Map, RPM Graph

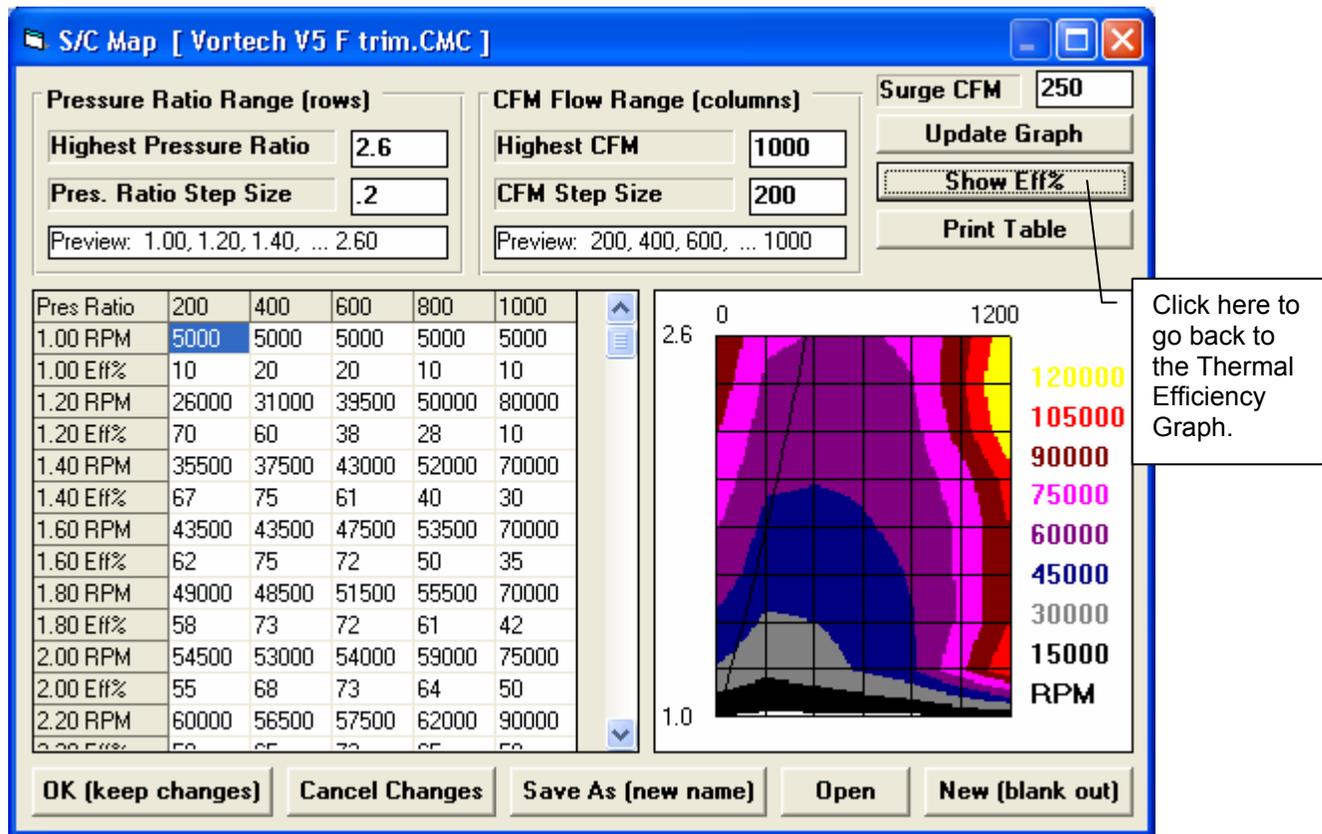


Figure A63 New Supercharger Type, Centrifugal Feeding into a Roots Supercharger

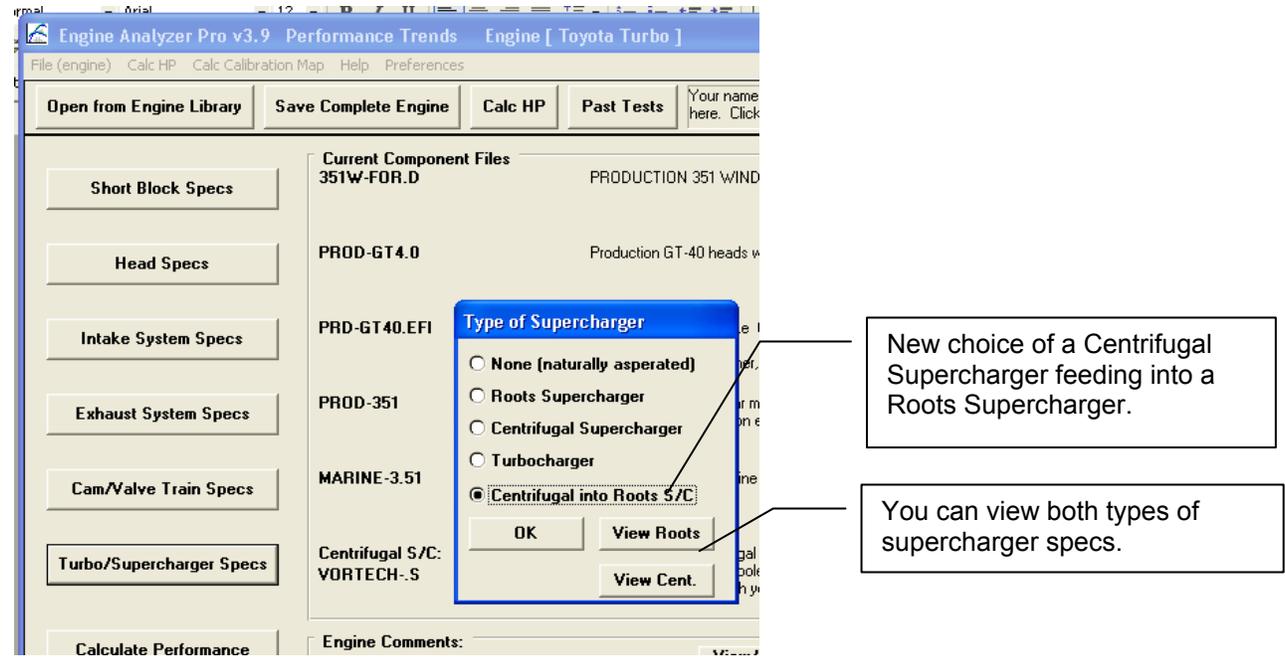
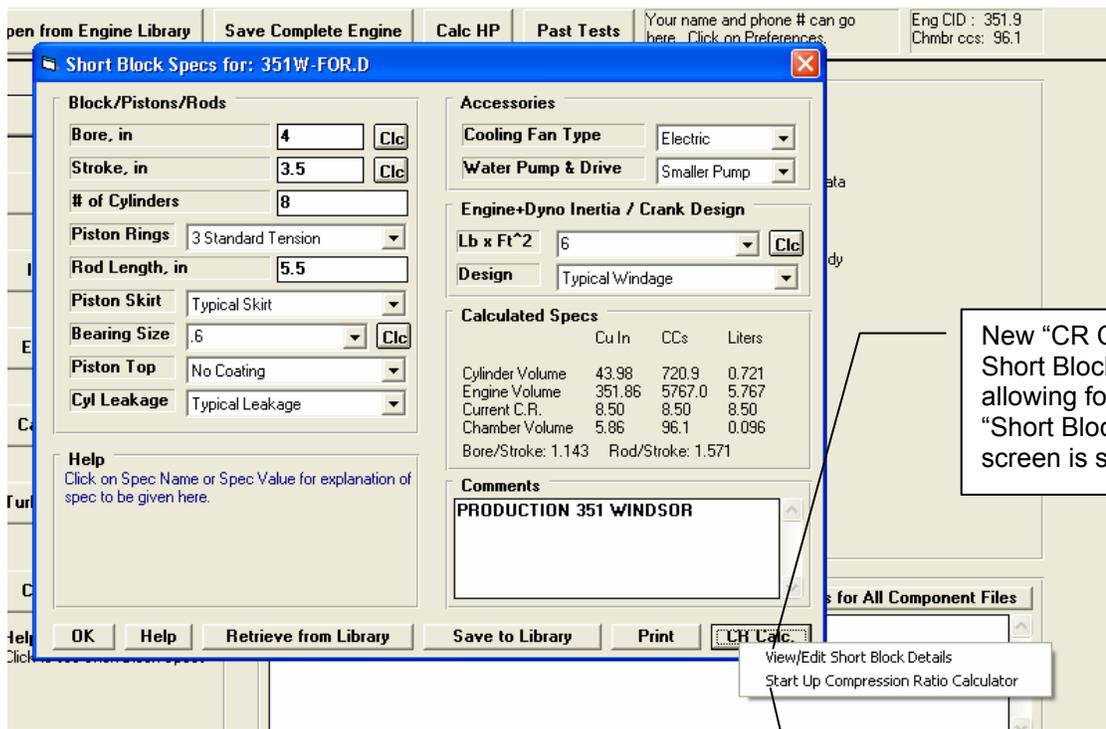
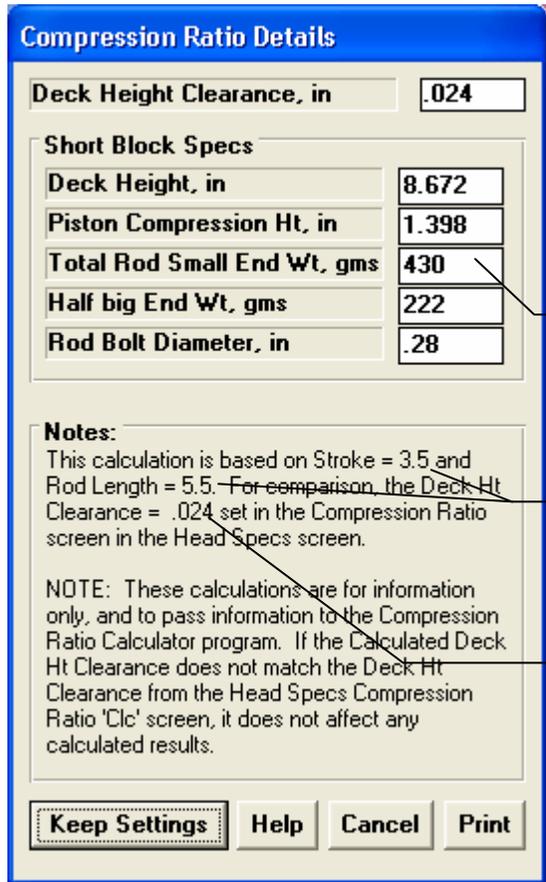


Figure A64 "Talking" to the Compression Ratio Calculator, Short Block Specs



New "CR Calc" button in Short Block Specs, allowing for 2 options. The "Short Block Details" screen is shown below.

Starting up the Compression Ratio Calculator is shown if Figures A65 and A66

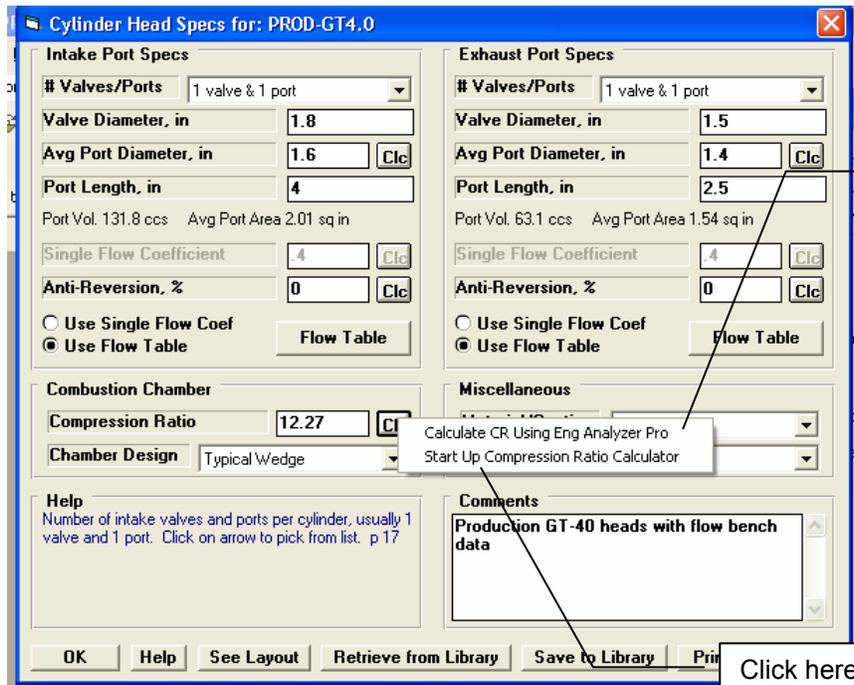


Total Small End Weight includes the piston, wrist pin and keepers, and rings in addition to just the small end of the rod. This is used in the Compression Ratio Calculator to estimate loads on the rod bolts at a particular RPM.

Current Stroke and Rod Length used for the Deck Height Clearance calculation.

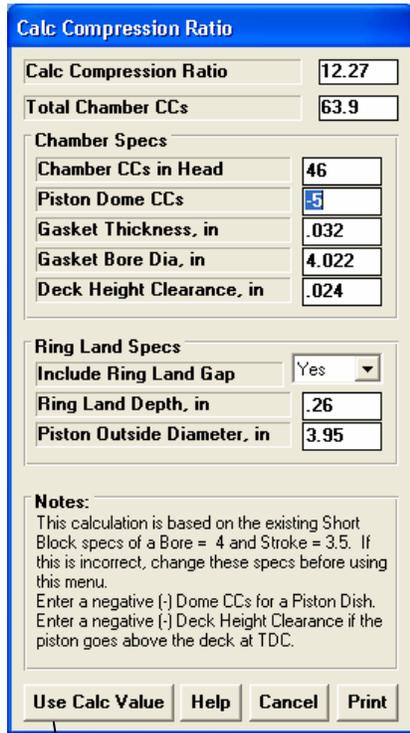
Current Deck Height Clearance which has been set in the Compression Ratio utility menu in the Heads Specs screen. See Figure A64. Ideally you will adjust specs either on this screen or the Compression Ratio utility screen to get these to match each other.

Figure A65 "Talking" to the Compression Ratio Calculator, Cylinder Head Specs

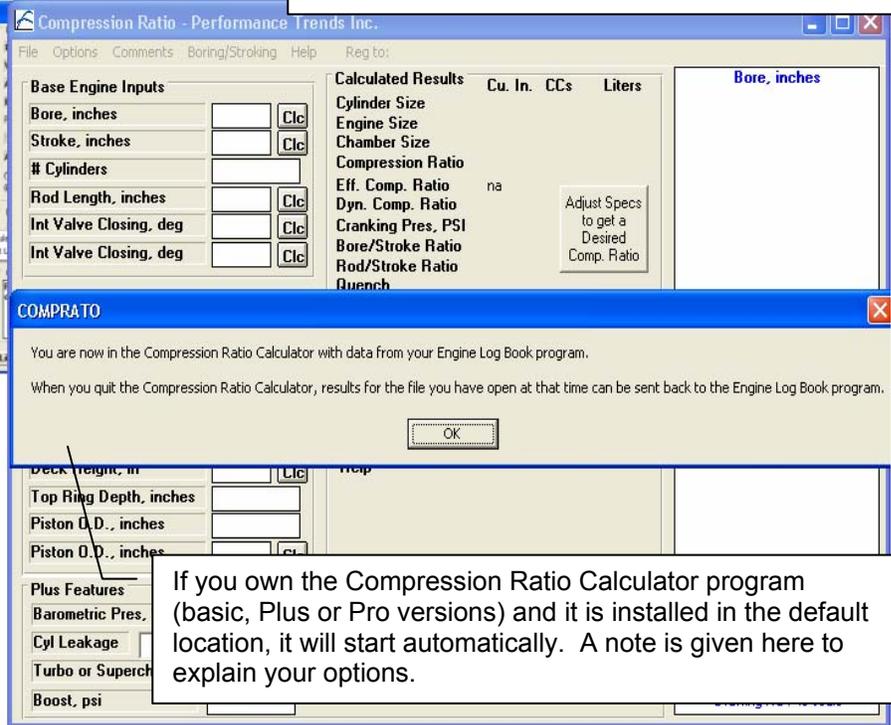


Two options from the Cylinder Head Specs screen. The top option shows the same Compression Ratio utility screen in the standard Engine Analyzer Pro. However, in the Enterprise Edition, now these inputs are saved when you leave this screen so they can be transferred to the Compression Ratio Calculator program.

Click here to start up the Compression Ratio Calculator program shown below.



Compression Ratio utility screen in Engine Analyzer Pro (standard version and Enterprise Edition).



If you own the Compression Ratio Calculator program (basic, Plus or Pro versions) and it is installed in the default location, it will start automatically. A note is given here to explain your options.

Figure A66 Actual Compression Ratio Calculator Program Called from Engine Analyzer Pro Enterprise Edition

You will see most all your numbers from the Engine Analyzer Pro transferred over to the Compression Ratio Calculator. Now you can do any other detailed calculations as shown here.

Base Engine Inputs

Bore, in	4	Clc
Stroke, in	3.5	Clc
# of Cylinders	8	
Rod Length, in	5.5	Clc
Int Valve Closing, deg		Clc
Deck Height, in	8.672	Clc

Chamber/Piston Inputs

Chamber CCs in Head	46	Clc
Piston Design	Dish Top	
Piston Dish, ccs	5	Clc
Gasket Thickness, in	.032	Clc
Gasket Bore Dia, in	4.022	Clc
Deck Ht Clearance, in	.024	Clc
Piston Ring Depth, in	.26	
Piston Top O.D., in	3.95	
Compression Ht, in	1.398	Clc

Plus Features

Barometric Pres, "Hg	29.6	
Cyl Leakage	Typical (production)	
Turbo or Supercharged	No	
Boost, psi		

Calculated Results

Cylinder Size	Cu. In.	CCs	Liters
Engine Size	43.98	720.9	0.721
Chamber Size	351.86	5767	5.767
Compression Ratio	3.9	63.9	0.064
Eff. Comp. Ratio	12.27		
Dyn. Comp. Ratio	na		
Cranking Pres, PSI	na		
Bore/Stroke Ratio	1.143		
Rod/Stroke Ratio	1.571		
Quench	.056		

Volume Contributions

	Cu. In.	CCs	% of Total
Head Chamber	2.807	46	71.9
Gasket	0.407	6.66	10.4
Deck	0.302	4.94	7.7
Piston Dish	0.305	5	7.8
Piston O.D.	0.081	1.33	2.1

Help
The amount of volume in the cylinder head's combustion chamber, measured in cubic centimeters.

Adjust Specs to get a Desired Comp. Ratio

If things do not "add up" as far as deck height stackup, a message is given as shown here and Deck Height Clearance is adjusted to make it "add up". NOTE: The Engine Analyzer Pro does not force these numbers to "add up" as most do not affect engine performance.

Deck Height Clearance Adjusted

Deck Height Clearance will be adjusted to be consistent with the current Stroke, Rod Length, Deck Height and Compression Ht.

If this is not what you want to have done, click on one of the Calc buttons by the spec you want adjusted to fit the other specs (after you click on OK on this message).

(This notice given only once for each program startup.)

OK

When leaving the Compression Ratio Calculator, you are given these 3 options.

Keep Your Changes?

This file and all current settings will now be loaded back to the 'Engine Log Book'. Is this what you want to do?

Click on 'Cancel' to stop shutting down this Compression Ratio Calculator program.

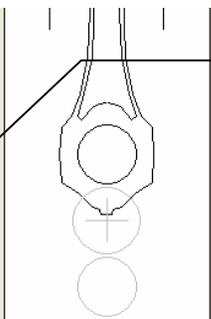
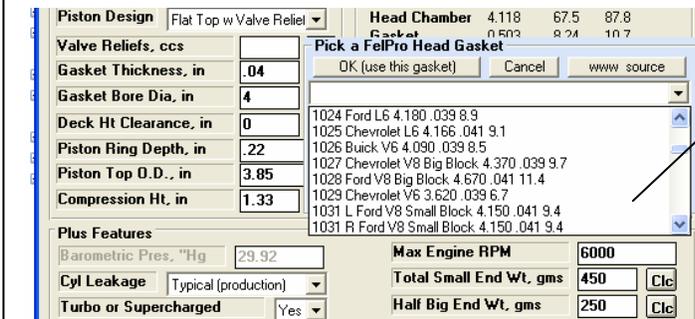
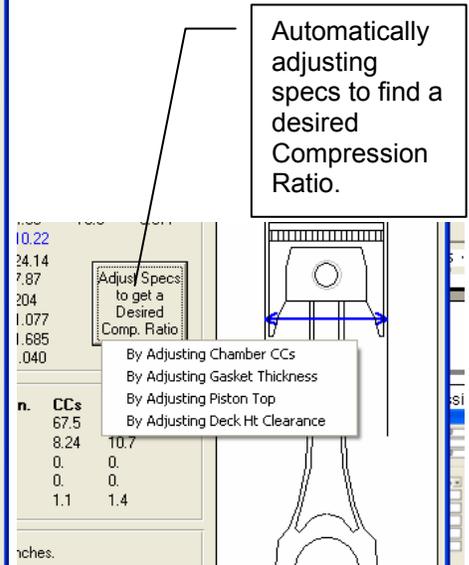
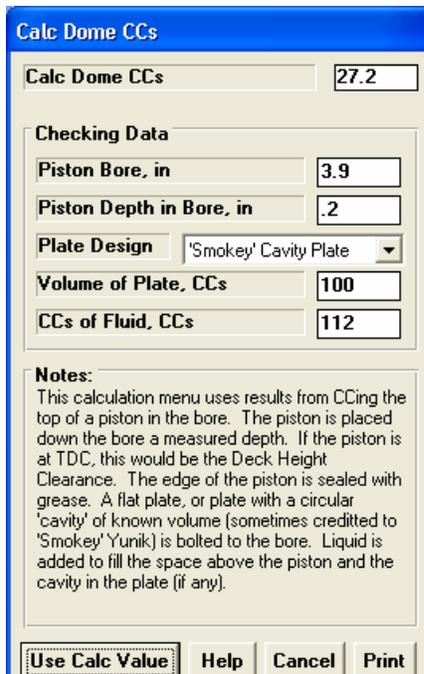
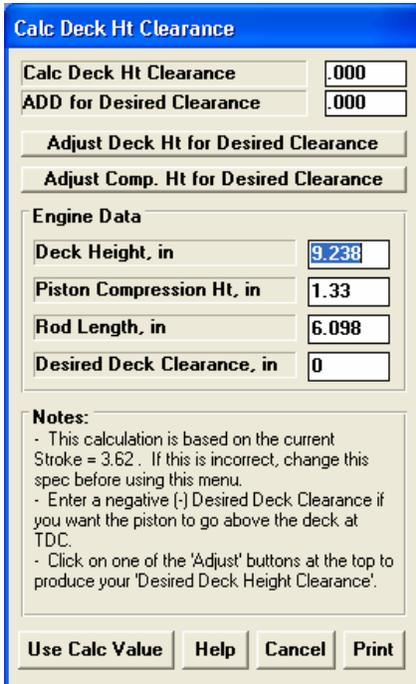
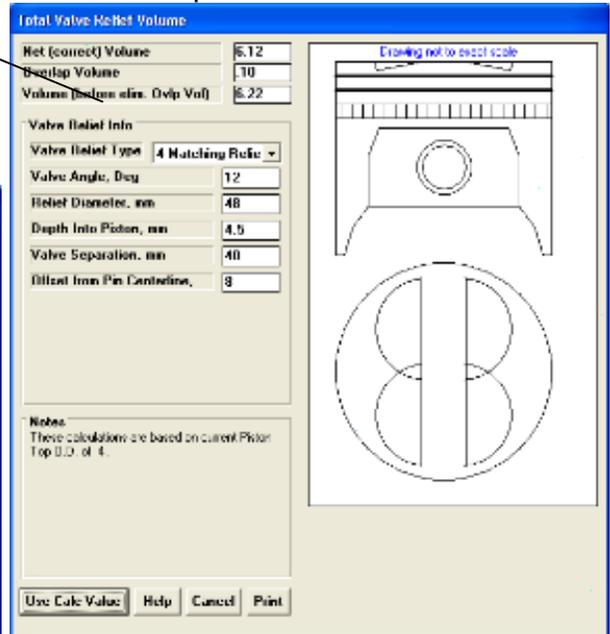
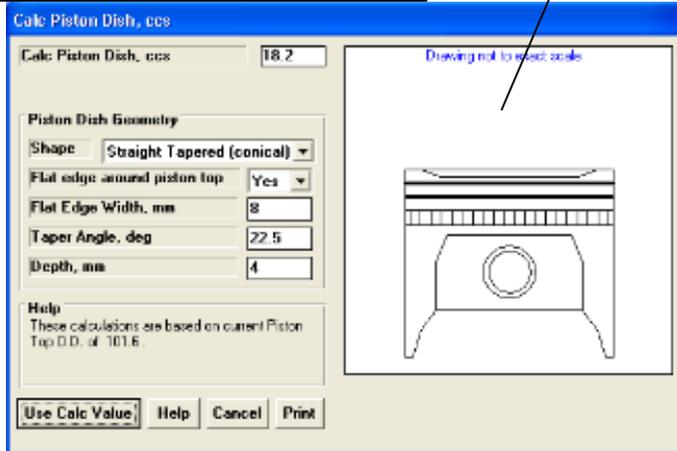
Click on 'No' to return to the Engine Log Book program but abandon any changes you've made in this program.

Yes No Cancel

If you choose Yes, you will see the numbers from the Compression Ratio Calculator transferred back to the EA Pro.

Figure A67 Some of the Advanced Features in the Actual Compression Ratio Calculator

These 2 screens (and several others for calculating volumes from geometry) are only available in **Pro version** of Compression Ratio Calculator.



Picking gasket specs from pre-loaded list of gaskets.

Figure A68 Calculating a Part Throttle "Calibration" Map

Click here at top of main screen for these options.

Calibration Map

Calibration Map

MAP Steps, psi: 2 psi

Highest Map, psi: Full Power, WOT

Lowest Map, psi: 4

Keep Specs Help Cancel Print

Here's the Map Details, which is basically the starting and ending MAP (manifold absolute pressure) points and increments. The RPMs which are run are set the same as for WOT (wide open throttle) performance, in the Calculate Performance screen.

Click on ASCII File to produce the 2 types of files shown in Figure A68. You will be asked for a file name and folder for storing the files. Then the program will write 2 files, a ".csv" or comma separated variable file which imports to Excel, or a ".txt" file which is tab delimited and reads better in

Here's the MAP for each section of results. The first section was a WOT, so map changes as manifold vacuum changes.

Engine RPM	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
Brk Tq, ft-lbs	284.21	308.29	321.89	332.44	352.29	358.92	341.86	304.79	257.02	210.09
Brake HP	54.11	88.05	122.58	158.24	201.23	239.19	260.37	261.15	244.69	220.01
MAP, psi	14.5	14.5	14.5	14.5	14.4	14.4	14.3	14.3	14.3	14.3
Vol Eff, %	72.8	75.3	78.6	82.3	88.5	92.3	90.9	85.7	76.5	73.7
BSEFC, lb/HP-hr	.479	.456	.456	.462	.469	.480	.496	.525	.556	.655
Injctr Dty Cyc, %	17.036	26.412	36.764	48.139	62.146	75.586	85.040	90.238	89.456	94.825
Inj Plse Wdth, ms	20.443	21.129	22.058	23.107	24.859	25.915	25.512	24.063	21.469	20.689
A/F Mxtr Qlty, %	93.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Knock Index	2.6	2.3	2.2	1.9	1.9	1.8	1.6	1.3	1.0	.8
Spark Advnc, deg	20.2	22.5	24.1	25.4	26.3	27.2	28.5	29.9	31.9	33.5
Fuel Flow, lb/hr	25.89	40.15	55.88	73.17	94.46	114.89	129.26	137.16	135.97	144.13
Brk Tq, ft-lbs	268.57	292.71	306.29	317.75	337.49	345.95	330.63	296.36	248.51	203.65
Brake HP	51.14	83.60	116.64	151.25	192.78	230.54	251.81	253.93	236.58	213.27
MAP, psi	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Vol Eff, %	69.7	72.1	75.5	79.3	85.6	89.6	88.5	83.7	74.7	72.1
BSEFC, lb/HP-hr	.484	.460	.460	.466	.474	.484	.500	.527	.562	.661
Injctr Dty Cyc, %	16.296	25.318	35.322	46.366	60.087	73.409	82.856	88.069	87.408	92.781
Inj Plse Wdth, ms	19.555	20.254	21.193	22.255	24.035	25.169	24.857	23.485	20.978	20.248
A/F Mxtr Qlty, %	93.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Knock Index	2.4	2.2	2.1	1.9	1.8	1.7	1.5	1.3	1.0	.8
Spark Advnc, deg	20.4	22.8	24.4	25.7	26.5	27.4	28.6	30.0	32.2	33.7
Fuel Flow, lb/hr	24.77	38.48	53.69	70.48	91.33	111.58	125.94	133.87	132.86	141.03
Brk Tq, ft-lbs	211.98	232.04	243.80	254.20	271.16	277.60	263.61	233.25	191.09	152.92
Brake HP	40.36	66.27	92.84	121.00	154.89	185.00	200.77	199.86	181.92	160.14
MAP, psi	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Vol Eff, %	58.1	60.2	63.2	66.5	72.0	75.4	74.2	69.8	62.1	59.8
BSEFC, lb/HP-hr	.512	.485	.484	.489	.496	.507	.525	.559	.607	.731
Injctr Dty Cyc, %	13.591	21.144	29.588	38.902	50.529	61.708	69.405	73.518	72.659	76.961

Figure A69 Part Throttle "Calibration" Map Written to ASCII Files (see Fig A67)



Notepad displaying the .txt format file.

CalcMap.txt - Notepad

Engine RPM	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
Brk Tq; ft-lbs	284	308	322	332	352	359	342	305	257	210
Brake HP	54.1	88.1	122.6	158.2	201.2	239.2	260.4	261.1	244.7	220.0
MAP; psi	14.5	14.5	14.5	14.5	14.4	14.4	14.3	14.3	14.3	14.3
Vol Eff; %	72.8	75.3	78.6	82.3	88.5	92.3	90.9	85.7	76.5	73.7
BSFC; lb/HP-hr	.479	.456	.456	.462	.469	.480	.496	.525	.556	.655
Injctr Dty Cyc; %	17.036	26.412	36.764	48.139	62.146	75.586	85.040	90.238	89.456	94.825
Inj Plse Wdth; ms	20.443	21.129	22.058	23.107	24.859	25.915	25.512	24.063	21.469	20.689
A/F Mxtr Qlty; %	93.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Knock Index	2.6	2.3	2.2	1.9	1.9	1.8	1.6	1.3	1.0	.8
Spark Advnc; deg	20.2	22.5	24.1	25.4	26.3	27.2	28.5	29.9	31.9	33.5
Fuel Flow; lb/hr	25.89	40.15	55.88	73.17	94.46	114.89	129.26	137.16	135.97	144.13
Brk Tq; ft-lbs	269	293	306	318	337	346	331	296	249	204
Brake HP	51.1	83.6	116.6	151.3	192.8	230.5	251.8	253.9	236.6	213.3
MAP; psi	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Vol Eff; %	69.7	72.1	75.5	79.3	85.6	89.6	88.5	83.7	74.7	72.1
BSFC; lb/HP-hr	.484	.460	.460	.466	.474	.484	.500	.527	.562	.661
Injctr Dty Cyc; %	16.296	25.318	35.322	46.366	60.087	73.409	82.856	88.069	87.408	92.781
Inj Plse Wdth; ms	19.555	20.254	21.193	22.255	24.035	25.169	24.857	23.485	20.978	20.243
A/F Mxtr Qlty; %	93.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

CalcMap.csv - Microsoft Excel

Engine RPM	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
Brk Tq; ft-lbs	284.21	308.29	321.89	332.44	352.29	358.92	341.86	304.79	257.02	210.09
Brake HP	54.11	88.05	122.58	158.24	201.23	239.19	260.37	261.15	244.69	220.01
MAP; psi	14.5	14.5	14.5	14.4	14.4	14.3	14.3	14.3	14.3	14.3
Vol Eff; %	72.8	75.3	78.6	82.3	88.5	92.3	90.9	85.7	76.5	73.7
BSFC; lb/HP-hr	0.479	0.456	0.456	0.462	0.469	0.480	0.496	0.525	0.556	0.655
Injctr Dty Cyc; %	17.036	26.412	36.764	48.139	62.146	75.586	85.040	90.238	89.456	94.825
Inj Plse Wdth; ms	20.443	21.129	22.058	23.107	24.859	25.915	25.512	24.063	21.469	20.689
A/F Mxtr Qlty; %	93.9	100	100	100	100	100	100	100	100	100
Knock Index	2.6	2.3	2.2	1.9	1.9	1.8	1.6	1.3	1	0.8
Spark Advnc; deg	20.2	22.5	24.1	25.4	26.3	27.2	28.5	29.9	31.9	33.5
Fuel Flow; lb/hr	25.89	40.15	55.88	73.17	94.46	114.89	129.26	137.16	135.97	144.13
Brk Tq; ft-lbs	268.57	292.71	306.29	317.75	337.49	345.95	330.63	296.36	248.51	203.65
Brake HP	51.14	83.6	116.64	151.25	192.78	230.54	251.81	253.93	236.58	213.27
MAP; psi	14	14	14	14	14	14	14	14	14	14
Vol Eff; %	69.7	72.1	75.5	79.3	85.6	89.6	88.5	83.7	74.7	72.1
BSFC; lb/HP-hr	0.484	0.46	0.46	0.466	0.474	0.484	0.5	0.527	0.562	0.661
Injctr Dty Cyc; %	16.296	25.318	35.322	46.366	60.087	73.409	82.856	88.069	87.408	92.781
Inj Plse Wdth; ms	19.555	20.254	21.193	22.255	24.035	25.169	24.857	23.485	20.978	20.243

Microsoft™ Excel displaying the .csv format file.

Figure A70 Language Translation and Other Preferences

New tab of Enterprise Edition Preferences

Choose amount you want these "stiffnesses" to be increased beyond the program's default assumptions. Typically increasing the stiffness improves valve train dynamics.

You can choose a different language here. See below.

Changing the Valve Toss Threshold will change the point at which you see warnings about Valve Toss in the output as shown here.

Engine RPM	5000	6000	7000	8000
Coolant HP	121.00	120.00	55.30	5.52
Blow By, CFM	4.9	4.3	3.0	1.7
In Tun Pres, PSI	6.9	4.9	.7	-1.0
Avg In Vel, ft/sec	292	351	409	468
Avg Ex Vel, ft/sec	358	430	502	573
Mach #	.655	.667	.702	.798
Act In FlowArea,%	98.1	115.5	128.0	128.8
Act Ex FlowArea,%	97.2	101.2	113.8	120.8
Valve Toss	None	In&Ex	In&Ex	In&Ex
Knock Index	4.6	1.8	.1	.0
Spark Advnc, deg	37.3	38.8	39.5	41.4
Injctr Dty Cyc, %	91.888	101.293	109.998	100.835
Inj Plse Wdth, ms	22.053	20.259	18.857	15.125
Calc Error	0	0	1	0

Valve Flow & Cam Calculations
Overlap Area. deg*sq-in 0.4

Changing language changes descriptions of inputs, and also brings up Balloon showing description in "Help"

If you change language, not all labels and choices are

Description in Help Frame.

Engine Analyzer Pro v3.9 Tip

Jedes Mal, wenn Sie Hilfe benötigen, an einem Eingang:

- Klicken Sie auf das spec Namen oder
- Klicken Sie auf das Eingabefeld

Und eine kurze Definition wird hier mit einer Seite # im Handbuch für weitere Informationen gegeben.

Don't show this again

Most critical "Tip" messages are also given in the chosen language. As we receive feedback from users, more items in the program will be translated, and the translations are likely to