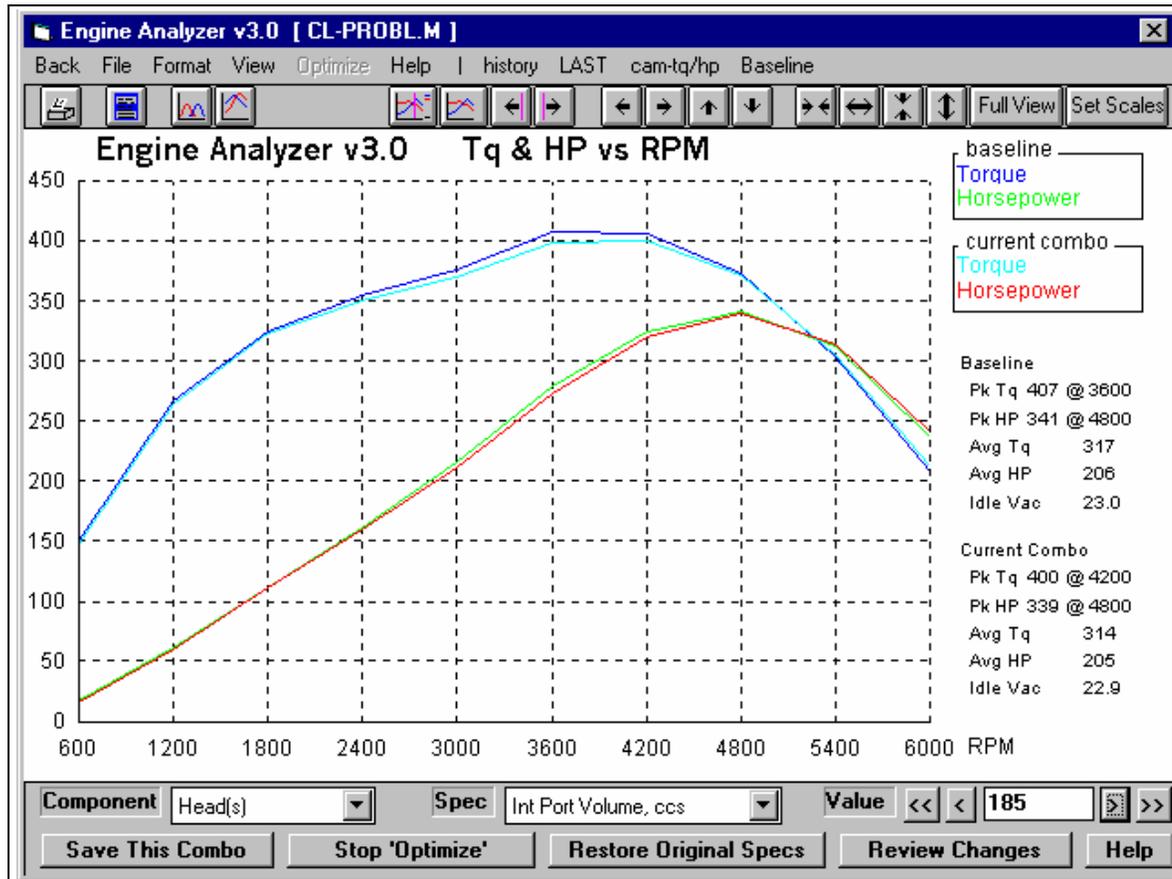


# Engine Analyzer 'Plus' Features Supplement



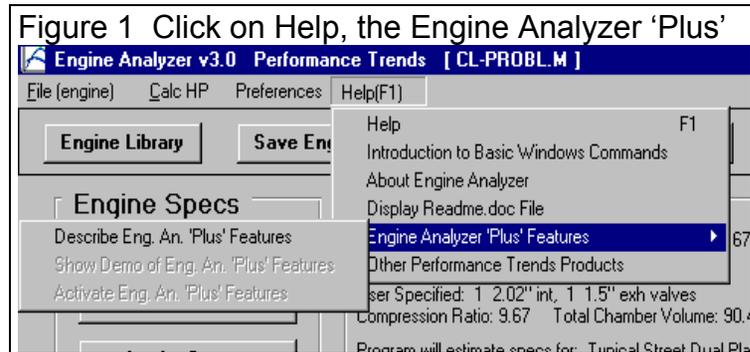
## PERFORMANCE TRENDS, INC.

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# Engine Analyzer 'Plus' Features

The Engine Analyzer Plus is a package of features the owners of the standard Engine Analyzer can add to their program. This package can be added either at the time of the original purchase or after they have purchased a standard program. See Figure 1 for obtaining information, activating your 'Plus' version, or running a demo of the 'Plus' features.



## Major Features:

- Calculate up to 20 RPMs.
- Calculate performance for alternate fuels like Diesel, propane or CNG (compressed natural gas).
- Estimate Piston-to-Valve Clearance.
- More graphing features.
- The 'Optimize' feature which lets you pick and modify most any engine specs and watch the effect on the torque and power curve right on the screen. This is great for quickly finding which specs have the most effect on your engine's performance.
- Use Full Flow Curve for cylinder head ports (New to Version 3.2)
- Use Millimeters (instead of inches) to enter engine dimensions (New to Version 3.2)
- Hide certain calculated output that you think is not important (New to Version 3.2)
- Choose different colors for graph lines, which can also effect the print quality when printing color graphs. (New to Version 3.2)
- Duration at .200" lift is displayed in the Cam Specs for the particular lobe you have specified. (New to Version 3.2)

## Calculate More RPMs Alternate Fuels

These 2 features are available in the Running Conditions screen. There, you can increase 'Number of RPMs' to calculate up to 20 for more detailed power curves. See Figure 2.

There are also many additional 'Fuel Types':

1. Propane (lo-pres. gas) is a typical vapor propane system. If you specify a Carburetor in the Intake System specs, the program assumes you will use a venturi type of 'mixer', which usually has to be fairly small (restrictive with low CFM rating) to work correctly. If you specify an EFI system, the program assumes you are injecting propane vapor, which does not require the restrictive 'mixer'.
2. Propane (hi-pres. liquid 'LPG') is a special high pressure, liquid injection EFI system.

3. Natural gas (methane or CNG) is a typical vapor methane system. If you specify a Carburetor in the Intake System specs, the program assumes you will use a venturi type of 'mixer', which usually has to be fairly small (restrictive with low CFM rating) to work correctly. If you specify an EFI system, the program assumes you are injecting methane vapor, which does not require the restrictive 'mixer'.
4. Truck Diesel (prod w low smoke) is a typical production Diesel Truck, running from about 23:1 to 30:1 A/F (very lean) at full load to avoid smoke. A/F is assumed to lean out at higher RPMs.
5. Auto Diesel (prod w low smoke) is a typical production car Diesel, running about 20:1 A/F (very lean) at full load to avoid smoke.
6. Diesel (race rich w high smoke) is a rich Diesel run in tractor pulls, and other types of racing. The engine exhausts thick, black smoke running this rich but increases its power.
7. Diesel (rich hi-smoke race-pump) is a rich Diesel run in tractor pulls, and other types of racing. The engine exhausts thick, black smoke running this rich but increases its power. It also uses a special, "quick delivery" pump which shortens the injection time, speeding up combustion time. This pump allows the Diesel to run a higher than normal RPMs.

## Estimate Piston-to-Valve Clearance

Figure 2 Plus Features in the Running Conditions Screen

You can now enter a number of up to 20 RPMs

The screenshot shows the 'Running Conditions' window with the following fields:

Test Conditions		Fuel Specs	
Weather	Use Conds Below	Type	Gasoline
Baro Pres, "Hg	29.9	Fuel Octane (R+M)/2	93
Intake Air Temp, deg F	80	RPMs to Run	
Dew Point, deg F	32	Starting RPM	600
Elevation, feet	0	Number of RPMs	10
Coolant Temp, deg F	190	RPM Increment	600
		RPM Preview: 600, 1200, 1800, .... 6000	

The 'Fuel Specs' section is expanded to show the following list of fuel types:

- Gasoline
- Very rich alcohol (for blowers)
- Propane (lo-pres. gas)
- Propane (hi-pres. liquid 'LPG')
- Natural gas (methane or CNG)
- Truck Diesel (prod. lean w low smoke)
- Auto Diesel (prod. rich w low smoke)
- Diesel (race rich w high smoke)
- Diesel (rich hi-smoke race-pump)

Click on Fuel Type for a list of several additional fuel types.

This screen will estimate how close the valves get to the piston. Although this is NO substitute to checking piston clearance with clay, it will let you try different cam profiles, rod lengths, strokes, head designs, etc to see how piston-to-valve clearance is likely to change.

### Assumptions:

- The program assumes a FLAT TOP piston. Clearances for domed pistons will be much tighter than shown here.
- The program assumes NO rod stretch and NO valve tossing or valve train bending. Therefore, clearances at high RPM are likely to be CLOSER than indicated here.

The clearances calculated are the closest the piston is to the valve, checked every 4 degrees of rotation. If the clearance is less than .100, the clearance is printed in red.

Negative (-) clearances mean the valve is extending into the piston that amount. For example, if clearance is -.048 and you want .100 clearance, you must notch the piston .148 inches.

### Definitions of input dimensions:

**Gasket Thickness:** Thickness of head gasket torqued to spec.

### Deck Ht Clearance:

Distance from piston top at TDC to block deck. If piston travels above the deck at TDC, enter a negative (-) number.

**Valve angles:** Largest angle between valve stem and line perpendicular (90 deg) to the deck surface. For 23 degree Chevy heads, this would be 23.

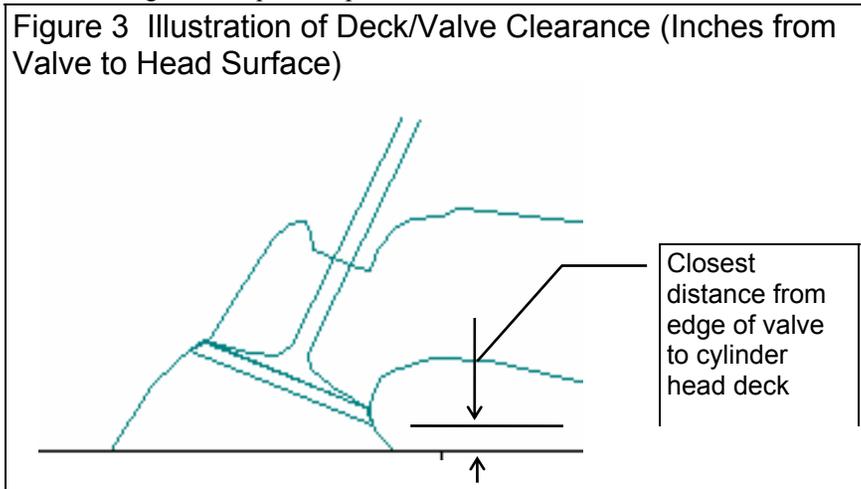
### Deck/Valve

**Clearance:** Closest distance between edge of valve and the head surface. If the valve(s) extend beyond the head surface (ex. valve touches table top when head sits on table), enter a negative (-) number for the amount of distance the valve edge extends beyond the head surface. See Figure 3.

Click on Save Specs and these dimensions are saved with the engine file.

Examples of dimensions for some typical heads are shown in Table 1.

## Table 1 Examples of Typical Head Specs



Head Description	Int Valve Dia	Exh Valve Dia	Int Valve Angle	Int Deck/Valve Clearance	Exh Valve Angle	Exh Deck/Valve Clearance
Stock SB Chevy 186, 492, etc	2.02	1.60	23	.01	23	.08
Brodix -8 SB Chevy	2.08	1.625	23	.10	23	.14
Merlin Cast Iron BB Chevy	2.19	1.88	27	.01	7	.55
Stock SB Ford 351 W	1.84	1.54	20	.08	20	.10
Stock Cleveland Ford 351 C	2.19	1.71	11	.13	11	.27
Stock Pontiac 400, 455, etc	2.11	1.77	14	.13	14	.20

**IMPORTANT:** These example specs may NOT exactly match your heads. Use with caution!

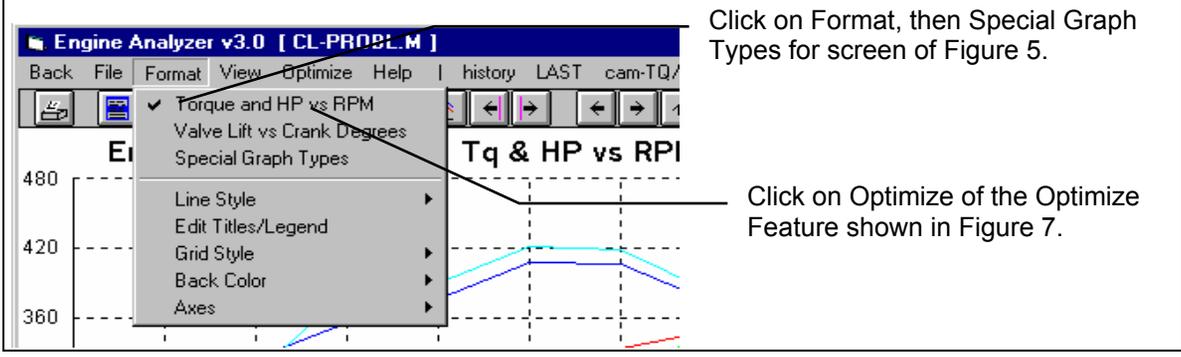
## Graphing Features

The 'Plus' features add 2 powerful features to the Graph Screen, shown in Figure 4:

1. Click on 'Format', then 'Special Graph Types' for a menu to graph most any calculated output vs RPM, like BSFC, Spark Advance, etc.
2. Click on 'Optimize' to display several options at the bottom of the graph screen to modify most any engine specs and see the effect immediately on the torque and HP graph.

These options are not visible unless you have the 'Plus' version or a displaying the 'Plus' version demo. Click on Help at the Main Screen, then 'Engine Analyzer 'Plus' Features' to turn on the demo. See Figure 1.

Figure 4 Graphing Features



Click on Format, then Special Graph Types for screen of Figure 5.

Click on Optimize of the Optimize Feature shown in Figure 7.

### Special Graphs

This menu lets you graph up to 4 different types of data on the same graph, for example Torque, HP and Spark Advance vs RPM.

First, select 'RPM Data, Use Specs Below' as the Graph Type.

Then select the # of Data Types to include in the graph, from 1 to 4. The appropriate # of graph specs will now be enabled.

Now you can select from the Data Types available, Torque, HP, BSFC, etc.

Then select the 'Multiplier' for each data type. For example, BSFC only ranges from say .4 to .5 but torque and HP may range from 100 to 500. BSFC would only show as a straight line a 500 HP scale. However, if you multiply BSFC x 1000, BSFC would now range from 400 to 500 and show up clearly. Therefore, select large multipliers for small data values.

Figure 5 Special Graphs Menu

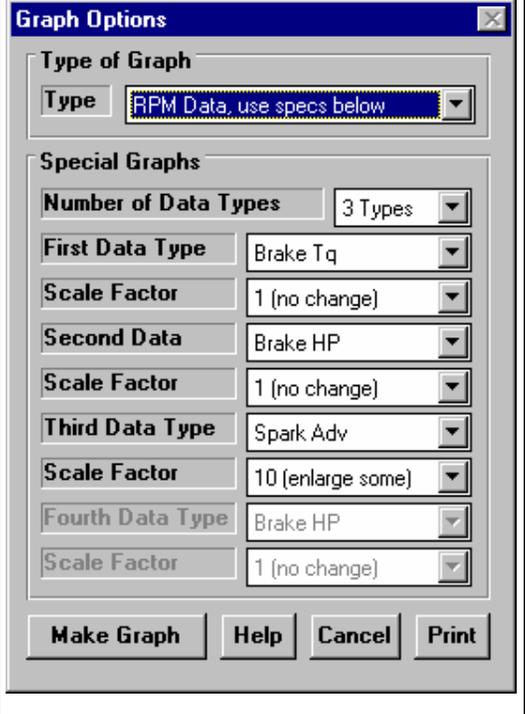
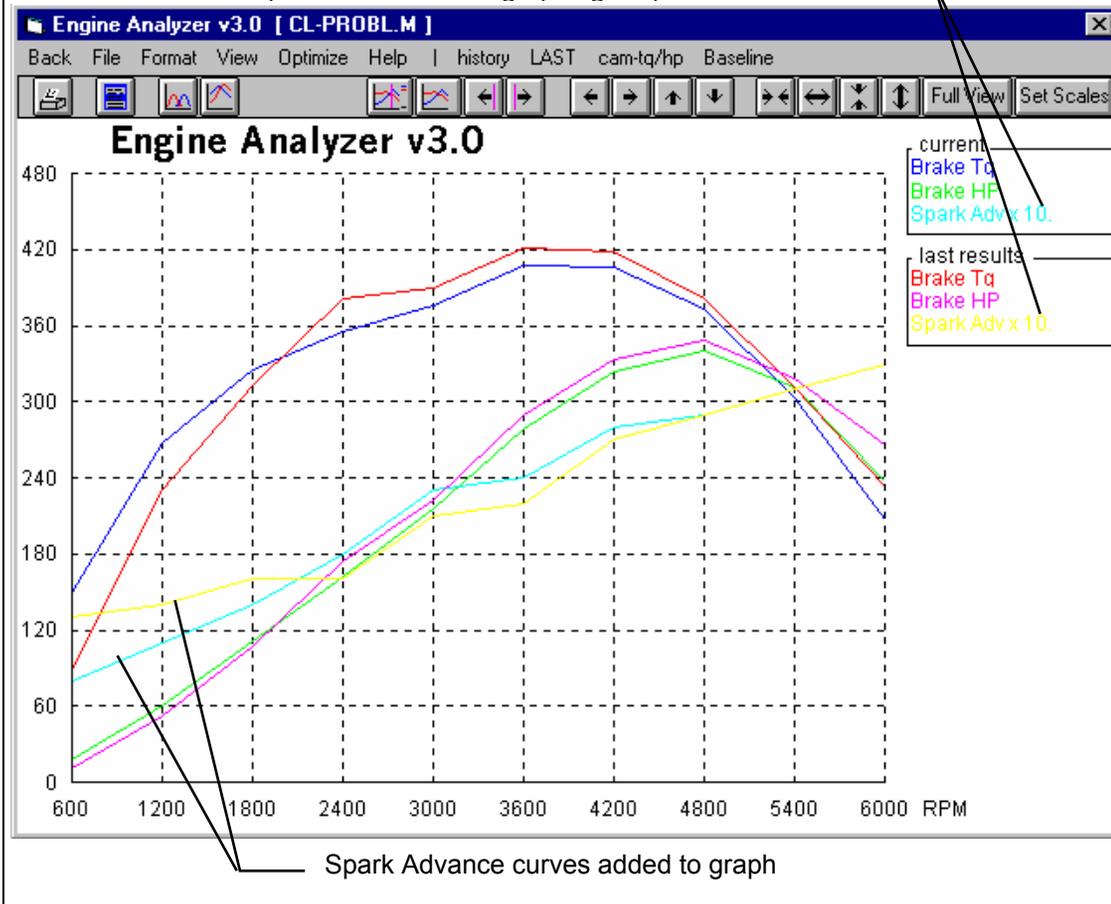


Figure 6 Special Graph Created from Specs of Figure 5

Legend shows Spark Advance is multiplied by 10 so it will show up on this scale also graphing torque and HP.



## Optimize

The Optimize feature lets you modify most any engine specs and immediately see the effect on performance. See Figure 7.

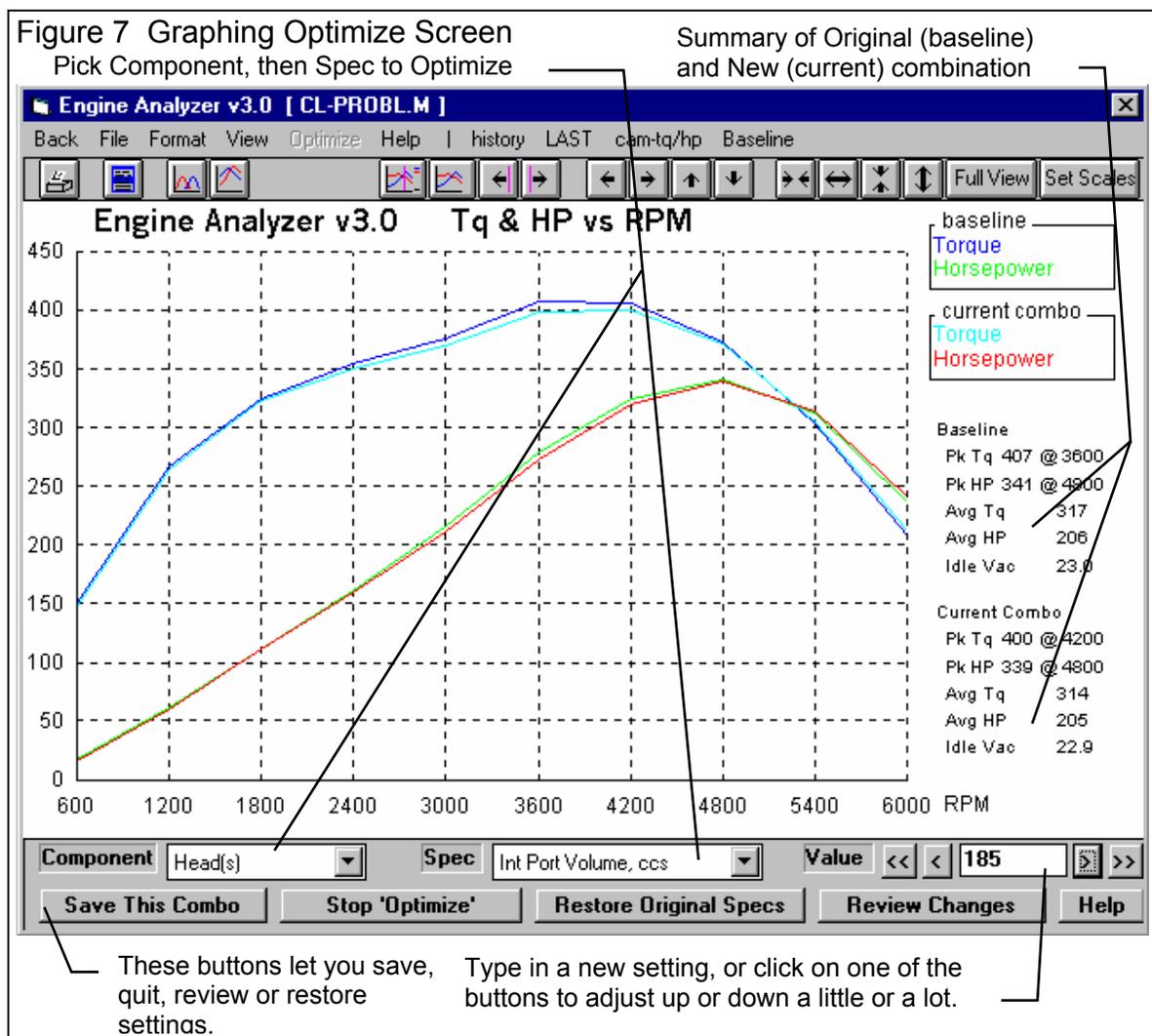
First, select the 'Component' you want to modify.

Then, select the 'Spec' for that Component.

Depending on the type of Spec you selected, you will have a list of settings, or a text box where you can type in a new setting. Each time you make a change to the setting, a new Torque and HP curve will be drawn so you can see the effect of this change.

The Optimize feature lets you modify just 1 spec or many specs for various components. For example, say you start by modifying Intake Cam Centerline from the original 110 deg to 104 degrees. Then you select to modify Intake Port Volume on the Head from the original 186 to 220 ccs.

Click on 'Save This Combo' to save any changes you have made to the Engine File you are working with. Note that you are not asked if you want to save to a New Name, meaning these changes overwrite the current specs for the current Engine File. Therefore, you may want to save your Engine to a New Name BEFORE you use the Optimize feature.

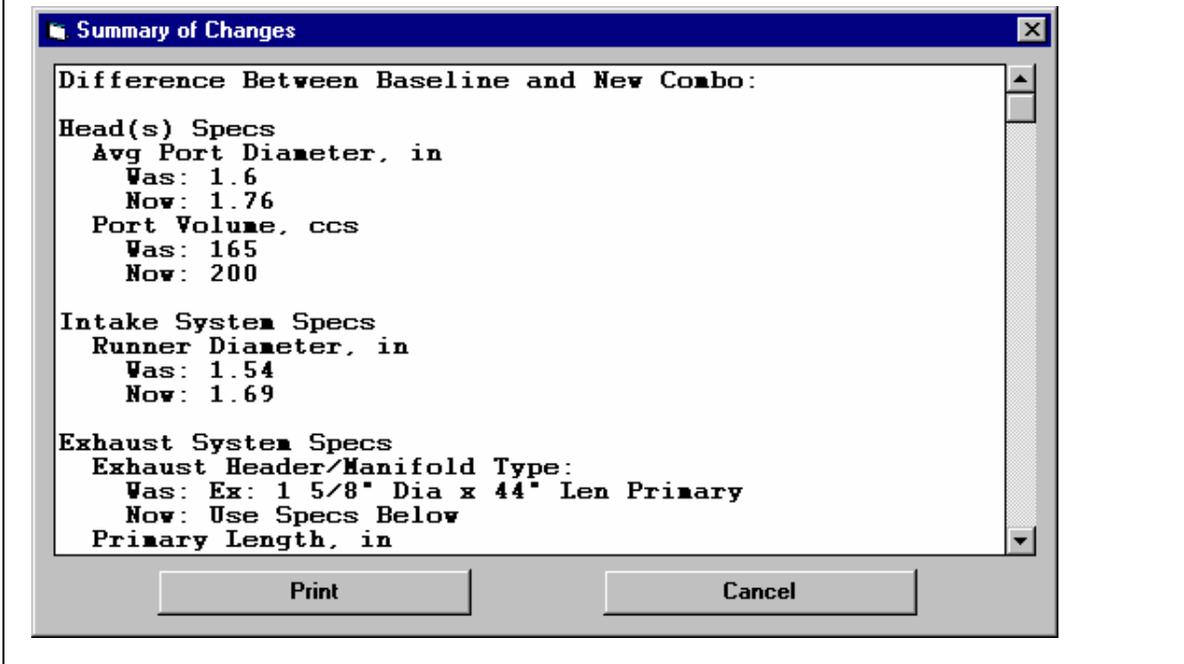


Click on 'Stop Optimize' to return to the normal graph screen and abandon any changes you have made.

Click on 'Restore Original Specs' to return all modified specs back to their original settings.

Click on 'Review Changes' and you will see a history of all changes you have made. Printing these changes is a convenient way to remember these changes. Then you can return to the Main Screen and make these changes and see the effects on other calculated output, like Spark Advance, or Exhaust Pressure, etc. See Figure 8.

Figure 8 Screen to Review Changes



# New Plus Features in Version 3.2

## Use Full Flow Curve or Flow Table

In the Head Specs menu, there is a check box to let you use the Avg Flow Efficiency for the port, or a Flow Table if you check the check box.

Figure 9 Flow Table Feature in Head Specs

Click here to produce the "See Table" button.

Click on "See Table" to display the table shown below.

The Avg Flow Efficiency is calculated from the 3 highest lift points you've entered, and is displayed for your information, so you have a sense of how good a port this is. You must enter at least 4 points before this is displayed. The program uses all points entered

**Head(s)**

**General Specs**

Notes: [ ]

Type: Use Specs in this Menu [v]

Chamber: Typical Wedge [v]

Compression Ratio: 10 [Clc]

Cyl Vol, cu in: 62.50 Chamber ccs: 113.8

**Intake**

Layout: 1 valve & 1 port [v]

Valve Diameter, mm: 50.93

Avg Port Diameter, mm: 47.24 [Clc]

Port Volume, ccs: 198

Port Length, mm: 113.03

Flow Efficiency, %:  Table See Table

**Exhaust**

Layout: 1 valve & 1 port [v]

Valve Diameter, mm: 41.28

Flow Efficiency, %:  Table 47.7 [Clc]

OK Help Get Example Save Example Print

**Calc Port Flow Table**

Avg Flow Efficiency, %: 47.4

Flow Data

Test Pressure, " water: 10

Lift 1	2	45
Lift 2	4	80
Lift 3	6	105
Lift 4	8	120
Lift 5	10	125
Lift 6	12	127
Lift 7		
Lift 8		

Note: Enter at least 4 valve lifts and flows for this port. 'Avg Flow Effcy' is based on only 3 highest lifts, and is shown just for info. Program uses full curve.

Sort Table Clear All Clear CFMs

Keep Table Help Cancel Print

Figure 10 Preferences for Plus Features

Choose what calculated data you do NOT want displayed or printed

Set desired Clearance for Piston-to-Valve calculation.

Choose if you want to use Millimeters for entering Engine Dimensions.

Set this to 'Yes' to have this screen define the graph colors.

Click here to get screen to right to pick which colors you want used for making graph lines.

**User Specified Graph Colors**

General Color Choices

Use User Specified Colors:  Yes

Background Color: Light Gray

0	1	2	3	4	5	6	
8	9	10	11	12	13	14	15

Color Codes for Individual Graph Lines

Line 1	10	Line 13	8	Line 25	6	Line 37	5
Line 2	10	Line 14	9	Line 26	8	Line 38	6
Line 3	10	Line 15	10	Line 27	9	Line 39	8
Line 4	12	Line 16	11	Line 28	10	Line 40	9
Line 5	13	Line 17	12	Line 29	11	Line 41	10
Line 6	14	Line 18	13	Line 30	12	Line 42	11
Line 7	1	Line 19	14	Line 31	13	Line 43	12
Line 8	2	Line 20	1	Line 32	14	Line 44	13
Line 9	3	Line 21	2	Line 33	1	Line 45	14
Line 10	4	Line 22	3	Line 34	2	Line 46	1
Line 11	5	Line 23	4	Line 35	3	Line 47	2
Line 12	6	Line 24	5	Line 36	4	Line 48	3

OK Cancel Help Load Default Colors

## Use Millimeters

Figure 10 shows where you can select to use Millimeters to enter engine dimensions like Bore, Cam Lift, etc. Note that these dimensions are changed if a file was saved in inches and the Preference is now set to MM. If you switch back and forth between inches and MM, the actual measurements may change slightly due to this conversion and rounding errors.

## Desired Piston-to-Valve Clearance

Figure 10 shows where you can select a Desired Piston-to-Valve Clearance from the drop-down list. Most engine builders use .100" clearance for the intake and exhaust, but you can select anything you want here. Because you can now select a clearance, the calculation menu for Piston-to-Valve Clearance is now different than in the earlier v3.0.

## Hide Output

Some users have requested that certain output be eliminated, that it can add to confusion to customers reading the output. Figure 10 shows where you can now select which outputs are not displayed or printed.

## Choose Different Graph Colors

Figure 10 also shows how you can select each color for each graph line. For example, if Yellow does not show up well on your printer, you can change each occurrence of yellow to, say pink. This screen also lets you change the background color.

# New Plus Features in Version 3.4

The Plus version now has over 20 added features compared to the Standard Engine Analyzer. Here's what we've added in v3.4 to the 10 Plus features in v3.2.

1. We've added the ability to import flow files from Port Flow Analyzer. Fig 11 and Fig 12.
2. We've added a new screen to let you do Variable Cam Timing (VVT). Fig 13.
3. Dwell over Nose (Cheater profile) can now be more exactly defined, to the nearest 2 degree increment. Fig 14.
4. Also, now this setting (Dwell over Nose) can be different on the intake vs the exhaust. Fig 14.
5. The program now allows for using a Ramp Rating for the cam profile for more exact cam profiles. Fig 14 and 15.
6. There is also a 'Clc' screen to calculate the ramp rating to match certain duration specs at either .200 lift or seat timing. Fig 14 and 15.
7. Program now has Fuel Option of E85. Fig 16.
8. We've added an option to include the Special Calculations section for writing ASCII files of test results. Fig 17.
9. Program now has an "Edit Printed Graph" command under Format. It opens a screen where you have several options on how to print your graph, include various comments, etc. You can now select to include the torque and HP data in a table when you print out RPM data graphs as long as there are torque and/or HP data on the graph. Fig 18 and 19.
10. You can now print a Company Logo graphics files on reports and graphs. This info is loaded in the Preferences screen. Fig 19 and 20.
11. You can specify 2 lines of text which can appear at the top of printouts of reports and graphs in the Preferences screen, under Printing/Graphing. Fig 19 and 20.

Figure 11 New Feature for Picking Example Component Files

Click on Get Example button in the Head Specs screen to bring up the screen below for importing a Head Flow File from out Port Flow Analyzer.

Click on this button to bring up the screens shown in Figure 12.

Tip: Click on a category in either section to highlight it, then click on the 'Use Category' button, or just Double Click on the category to pick in one step. (Categories are groups of examples, like a group of Chevy heads, not individual examples.)

Figure 12 Importing Head Files from Performance Trends' Port Flow Analyzer

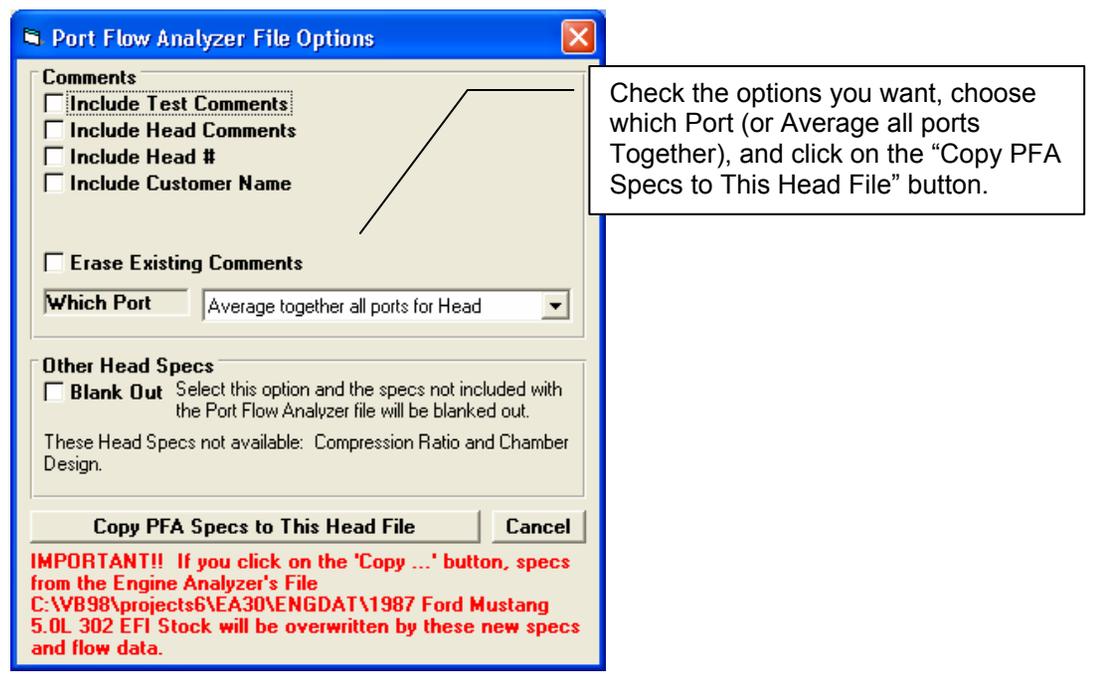
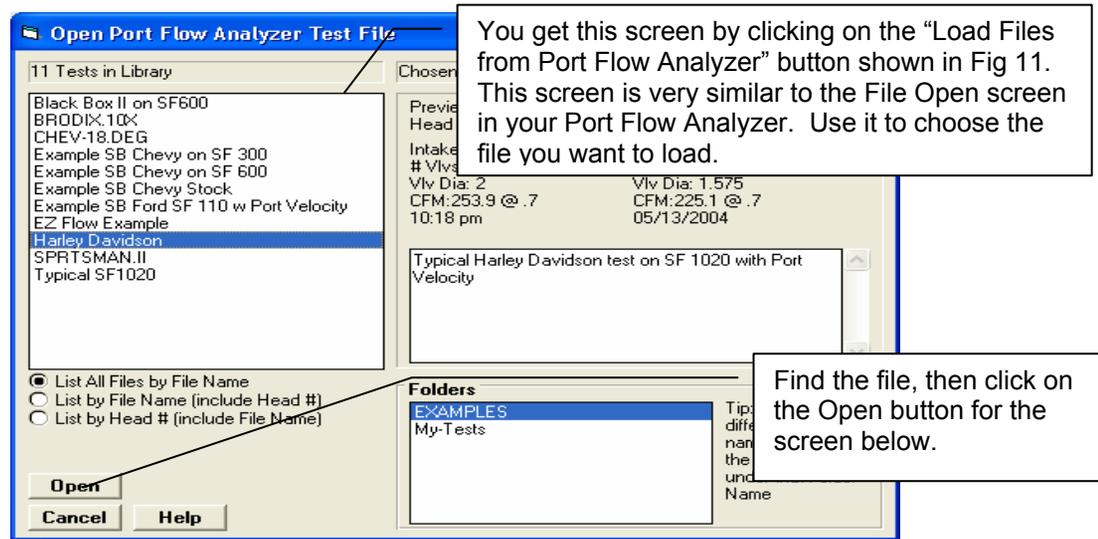


Figure 13 Variable Valve Timing (V V T) Specs

**Cam/Valve Train**

**General Cam Specs**

Notes: [ ]

Type: Use Specs in this Menu

Lift for Rating Events: .050 inches

Intake Centerline, deg ATDC: 116

Exhaust: [ ]

Total Cam Advance: 1.0 Retard

Lifter (profile) Type: Mild Hyd Roller

Valve Train: Pushrod w RockArm (product)

V.V.T.: No  Yes  See Specs

Choose Yes, and then you can click on the "See Specs" button to see screen below.

---

**Variable Valve Timing (VVT) Specs for: C**

Final Intake Cam Profile	Final Value	Starting Value	Change	Final Exhaust C
Centerline, deg ATDC	116.0	116	0.	Centerline, deg
Duration @ .050 "	240.0	202.	38.	Duration @ .050 "
Open @ .050 ", BTDC	4.0	-15	19.	Open @ .050 "
Close @ .050 ", ABDC	56.0	37	19.	Close @ .050 "
Max Lobe Lift, in	.32	.28	.040	Max Lobe Li

Enter the values you want to use at and above the "RPM to Change to Final Values" input in lower left

These are the settings from the original Cam Specs screen, shown for

This column shows the "Change" (difference) between the Starting Value and the Final Value.

Gross Valve Lift, in: 512 | 448

Your choice here determines which specs are enables on this screen.

General VVT Specs

Type: Use All Specs Above

RPM to Change to Final Values: 5000

Total Cam Advance, deg: 1.0 Retard

Lobe Separation, cam deg: [ ]

Enter the RPM at which the program should switch from the specs on the original Cam Specs screen to these VVT

Click here for more details on how this screen works.

Buttons: OK, Help, Print, Copy Int to Exh, Copy Exh to Int, Copy Starting to Final

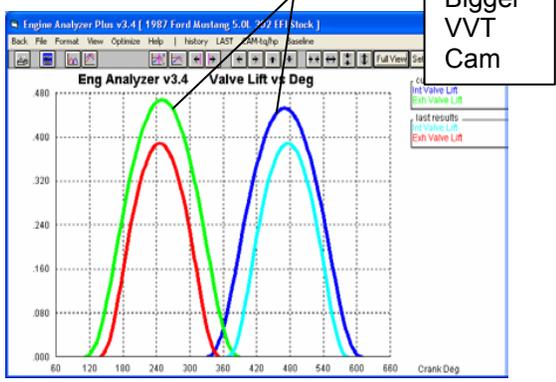
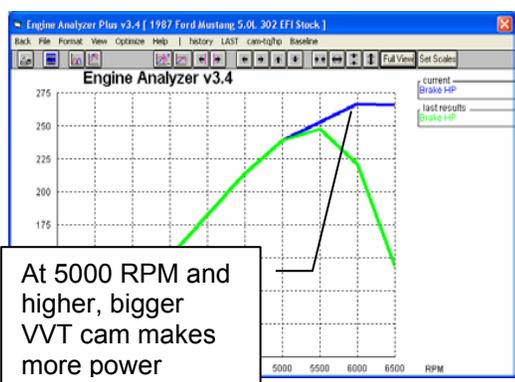


Figure 14 New Features in Cam/Valve Train Screen

The screenshot shows the 'Cam/Valve Train' software interface. It features several sections: 'General Cam Specs', 'Calculated Cam Specs', and a 'Help' section. Callouts provide detailed information about new features:

- Top Callout:** "Cheater" profiles are gone, replaced by Int and Exh "Dwell Over Nose" shown below.
- Upper Right Callout:** New "Spec" (specified) profile option displays Ramp Rating input below for you to "fine tune" the ramp.
- Left Callout:** Ramp Rating is displayed if you choose "Spec" (user specified) profile type in upper right corner. Click on the "Clc" button to calculate from 2 duration specifications (Figure A 15).
- Center Callout:** New VVT specs as shown in Figure 13.
- Bottom Callout:** You pick std (no dwell) or Typical Cheater (lots of dwell), or the Plus Version lets you fine tune this in 2 degree steps.

**General Cam Specs Section:**

- Notes:** Base production cam, Very mild 270 duration at .050", Mild lift also .260"
- Type:** Use Specs in this Menu
- Lift for Rating Events:** .050 inches
- Total Cam Advance:** 1.0 Retard
- Lifter (profile) Type:** Spec Solid Flat
- Valve Train:** Pushrod w RockrArm (race)
- V.V.T.:**  No  Yes **See Specs**

**Calculated Cam Specs Section:**

<b>Lobe Separation</b>	115.0	<b>Clc</b>
<b>Gross Valve Lift, in</b>	Intake: .416	Exhaust: .416
<b>Duration @ .200 "</b>	Intake: 84.8	Exhaust: 73.0

**Other Fields:**

- Duration @ .050 "**: 116
- Open @ .050 ", BBDC**: 170
- Close @ .050 ", ATDC**: -31
- Max Lobe Lift, in**: 21
- Lash at Valve, in**: .26
- Rocker Arm Ratio**: 1.6
- Ramp Rating, %**: .028
- Dwell Over Nose**: 6 Deg - Cheater
- Calculated Values:** 114, 170, 19, -29, .26, .028, 1.6, 34

**Buttons:** OK, Help, Get Example, Save Example, Print, Piston-Valve Clearance

Figure 15 Calc Ramp Rating Screen

**Calc Ramp Rating, %, Intake**

Calc Ramp Rating, %	44.5
Dwell Over Nose, deg	8
Duration @ Seat Timing	188
Minimum Tappet Dia, in	.962

**Cam Specs**

Based On: Duration @ .050" & .200"

Follower Type: Solid Flat

Allow Dwell Over Nose: User Specific

Dwell Over Nose, deg	8
Max Tappet Lift, in	.26
Designed Valve Lash, in	.028
Rocker Ratio	1.6
Duration @ Seat Timing	
Duration @ .050"	170
Duration @ .200"	90

Use Calc Value Help Cancel Print

You can calculate an exact Ramp Rating for a "General Description" or to match 2 specific duration inputs by your choice of "Follower Type". Four (4) calculated outputs describing the resulting profile are shown at the top of this screen.

Figure 16 New Features in Calculate Performance Running Conditions

The screenshot shows a software dialog box titled "Running Conditions". It is divided into two main sections: "Test Conditions" and "Fuel Specs".

**Test Conditions:**

- Weather: SAE Conds (77 deg, 29.6")
- Baro Pres. "Hg": 29.6 (with a "Clc" button)
- Intake Air Temp. deg F: 77
- Dew Point, deg F: 49 (with a "Clc" button)
- Elevation, feet: 0 (with a "Clc" button)
- Coolant Temp. deg F: 195

**Fuel Specs:**

- Type: Gasoline
- Fuel Description: A dropdown menu is open, showing the following options:
  - Propane (hi-pres. liquid 'LPG')
  - Natural gas (methane or CNG)
  - Truck Diesel (prod. lean w low smoke)
  - Auto Diesel (prod. rich w low smoke)
  - Diesel (race rich w high smoke)
  - Diesel (rich hi-smoke race-pump)
  - E85 (85% ethanol/15% gasoline)
  - Very Rich E85 (85% ethanol/15% gas)
- Approx. A: (field partially obscured)
- RPMs t: (field partially obscured)
- Starting: (field partially obscured)
- Number of Runs: 10
- RPM Increment: 500
- RPM Range: 2000 2500 3000 3500

Plus Version has E85 Fuel Options.

Figure 17 New Features for Writing ASCII Data Files

Engine Analyzer Plus v3.4 Performance Trends [CAM]

Back Graph Print View SendToVehProgram File Analyze Hel

Notes Summary: A/F mixture Ver  
Notes for details.

	2000	2500	3000	3500	4000	4
RPM	2000	2500	3000	3500	4000	4
Brake Tq	180	198	210	219	241	2
Brake HP	68.6	94.3	120	146	184	2

At the top of the Calculated Results, click on File for the screen shown in the lower left.

Plus Version has "Include Special Calculations" option.

Save as ASCII File

ASCII File Options

Comma Separated

Include Text

Convert to Columns

Include Special Calculations

File Name  Browse

Save File Cancel

Tip  
Enter a valid file name (and path if you want) to save ASCII file. If just a file name is given, the file is saved to the Engine Analyzer directory. Refer to page 98 and 102 in User's Manual for definitions of Options

KEVIN.TXT - Notepad

File Edit Format View Help

RPM	2000	2500	3000	3500	4000
Brake Tq	180	198	210	219	241
Brake HP	68.6	94.3	120	146	184
Exh_Pres	.0	.0	.0	.0	.0
Int_Vacuum	0.0	0.0	.1	.1	.1
Vol_Eff_%	80.4	81.8	82.4	82.7	85.6
Actual_CFM	151	192	232	272	322
Fuel_Flow	80.2	102	123	144	171
A/F_Mix_Qal	50.1	57.8	64.6	70.8	76.4
BSFC	1.169	1.081	1.028	.990	.931
BSAC	9.668	8.940	8.499	8.185	7.696
Friction_HP	15	22	29	38	49
Mach_#	.118	.147	.176	.206	.235
Piston_Spd	1000	1250	1500	1750	2000
Piston_Gs	221	345	497	676	883
Overlap_%VE	-.2	-.1	-.2	-.3	1.5
Int_AvgVel	0	0	0	0	0
In_InertiaPrs	.0	.0	.0	.0	.0
In_ResTunPrs	0.0	0.0	0.0	0.0	0.0
Ex_AvgVel	98	122	147	171	196
ExTun_Prs	.1	0.0	.5	1.1	-.4
Lifter_Pump UpNone					
Spark_Adv	29				

Special Calculations:

----- Valve Flow & Cam Calculations -----

Overlap Area, sq in*deg	1.5	Total Avg Flo
Total Exh/Int %	77.2	Lobe Area, in
Lobe Separation, deg	108.0	Ulv Area, deg
		Lobe CenterL:

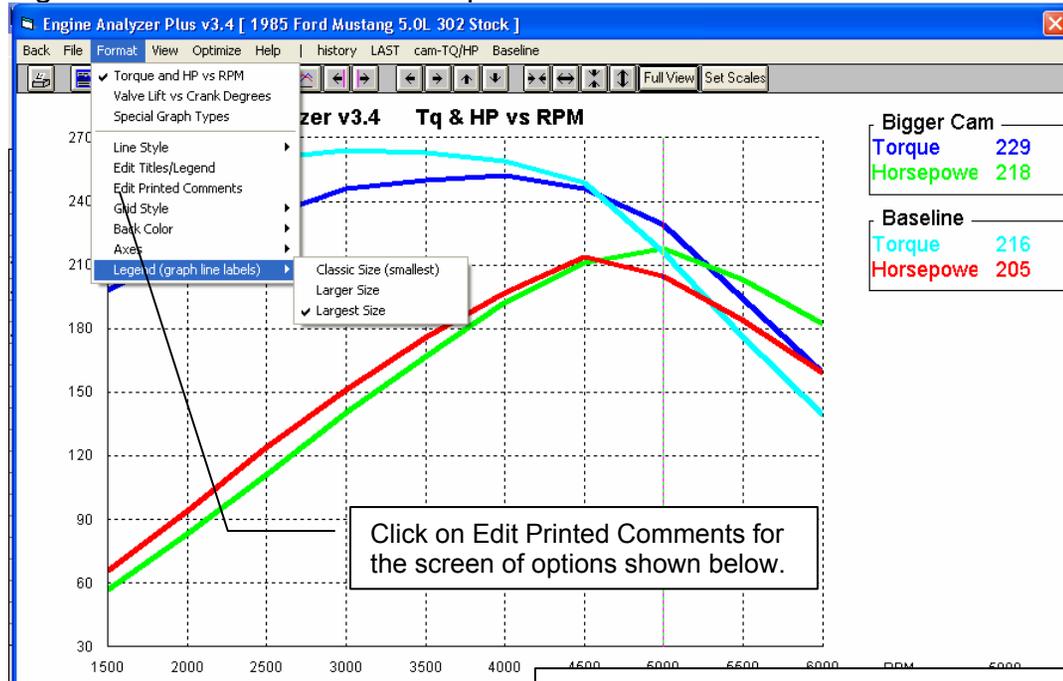
----- General Engine Calculations -----

Displacement, cc	4943.1	Displacement
Dynamic Comp. Ratio	7.07	Compression I
Theo. Crank Comprssn,PSI	170	Clearance Vo:
		Est Idle Vac

Ln 22, Col 42

Note that this file includes the Special Calculations.

Figure 18 New Features for Graphs Screen



Choose option to display the different options available for each test being

The 'Printed Graph Comments' dialog box is shown. It has a title bar 'Printed Graph Comments' and a subtitle '2 Graph Data Sets (comments available for each Data Set)'. There are two radio buttons for '1' and '2', with '1' selected. The 'Graph Title' field contains 'Bigger Cam'. The 'Test Comment' field contains '220 deg @ .050" Intake' and '228 deg @ .050" Exhaust'. The 'Engine Comment' field contains 'Bigger Cam on this 302'. The 'Graph Comment' field contains '302 V-8 Cam Comparison'. There are checkboxes for 'Include on Graph' with 'Test Comments', 'Engine Comments', 'Graph Comment', 'Tq / HP Data', and 'Engine Picture' all checked. There are radio buttons for 'Titles to Use' with 'Std Titles' and 'Alt. Titles' (selected). A 'See Titles' button is present. 'OK' and 'Help' buttons are at the bottom.

Options and the Comment in this lower section apply to the whole graph. Figure A 23 shows a printout for the options picked here.

Figure 19 Printed Graph with New Features



Engine Analyzer v3.4  
Eng: 1985 Ford Mustang 5.0L 302 Stock  
Calculated Test Results

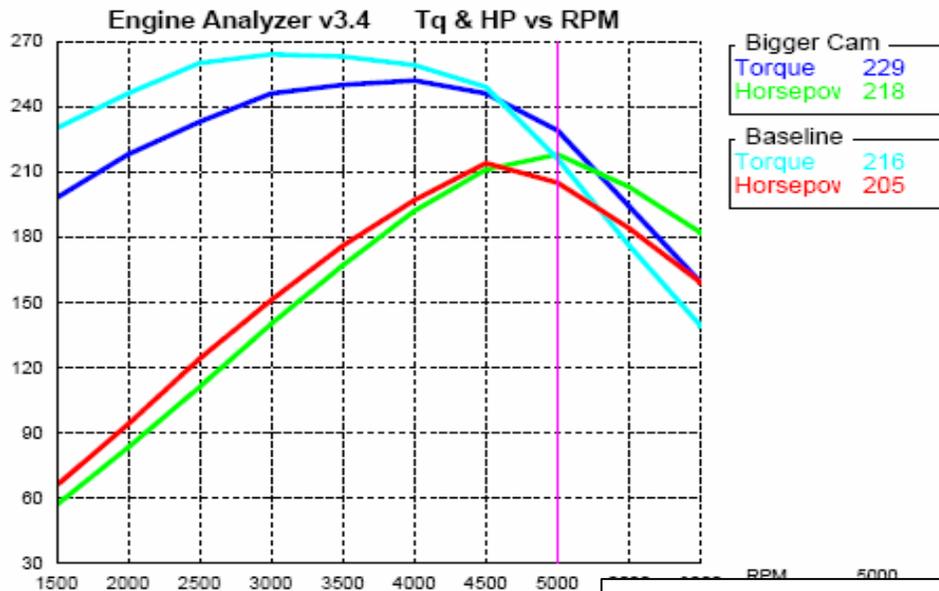
Kevin's Engine Analyzer for  
Calculations  
Performance Trends (C) 2009

This Graph Printed:  
4:15 pm 04-08-10  
Page: 1



Company Logo graphics file (Plus version only)

2 lines of user entered text (Plus version only)



302 V-8 Cam Comparison

Test and Engine Comments for: Bigger Cam  
220 deg @ .050" Intake

228 deg @ .050" Intake											
Bigger Cam on this 302	RPM	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
Tq	198	218	233	248	250	252	248	229	194	159	
HP	56.7	83.1	111	140	167	192	211				

Test and Engine Comments for: Baseline  
302 with V V T

302 Baseline	RPM	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
Tq	230	248	260	264	263	259	249	216	176	139	
HP	65.7	93.8	124	151	176	197	214	205	184	159	

Additional text and data printed at bottom of page, under graph, as selected in screen shown in Figure A 22.

Comments and data may continue onto a 2<sup>nd</sup> page as shown

Figure 20 New Preferences

