

Simulation

Environment

Temperature:	60.0 deg F	Humidity:	50.0 %	Altitude:	387.00 ft
X	Calculated Value	—	Manual Entry		0.98486

Short Block

Short Block:	3.8L				
No. Cylinders:	6	Bore:	3.800 in	Rod Length:	6.380 in
Total Volume:	231.4 ci	Stroke:	3.400 in	Rod Ratio:	1.876
				Pin Offset:	0.050 in

Cylinder Heads

Type: Custom Airflow

Valve Specifications:

Intake Valves/Port:	1	Exhaust Valves/Port:	1
Intake Valve Dia:	1.710 in	Exhaust Valve Dia:	1.490 in

Combustion

Compression Ratio:	9.00		
Combustion Space:	78.99 cc	Cylinder Volume:	631.88 cc

Fuel Type:	Methanol	Nitrous Augmentation:	0.0 HP
Air Fuel Ratio:	5.80	Equivalence Ratio:	1.12

Combustion Chamber Design: Wedge, Closed

Chamber Timing Requirements: 28.0 Deg

Ignition Timing (Spark Timing)

X Estimate Ignition Timing (For Best Torque @ Each RPM Point)

Basic Ignition Timing @ Crank: *** Deg BTDC

Timing Advance (Mechanical): 0.0 Deg Per 1000 RPM

Until: 3000 rpm

Induction

Manifold Type: Tuned Runner, Short Max-Flow, Large Plenum					
Total Induction Airflow:					
Flow Rate: 440.8 cfm @ 1.50 inHg					
Forced Induction Specifications:					
Blower Type:	None		Surge	Choke	Overspeed
Turbine Size:	*** in	Turbine A/R:	***		
Internal Ratio:	***	Belt Ratio:	***	Number Turbos:	1
Boost Limit:	*** psi	Intercooler Eff:	None	IC Press. Drop:	None

Exhaust

Exhaust Model:	Small-Tube Headers, Mufflers W/Cat
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Camshaft

Cam Type: Buick 63-235-4 V6						
Cam Specification	Intake	Exhaust	V-V-T Enable			
Gross Lobe Lift:	0.254 in	0.255 in	X	Display Low-Speed Lobe		
Rocker Ratio:	1.60	1.60	—	Display High-Speed Lobe		
Valve Lash:	0.000 in	0.000 in	Cam Specification			
Lift At Valve:	0.407 in	0.408 in	Lobe Centerline:	111.2		
Duration:	242.6	252.0	Valve Overlap:	24.9		
Centerline Angle:	111.1	111.3	Lifter Accel Rate:	2.27 (Auto)		
True Centerline Ang:	111.1	111.3	Timing Based On:	Seat-To-Seat		
Cam Adv(+)/Ret(-):	0.0	0.0	HS Lobe Activation:	5000 rpm		
Valve Events			IVO	IVC	EVO	EVC
Simulation Timing (Seat-to-Seat):			10.2	52.4	57.3	14.7
Additional Timing (0.050-inch):			-20.5	21.7	26.6	-16.0
Simulation Timing (720-Based):			349.8	592.4	122.7	374.7
True Timing (Corrected For Cam Adv/Ret):			10.2	52.4	57.3	14.7

Notes

CYLINDER HEAD AIRFLOW DATA

Description: 2-Valve, Wedge, Low Perf/Pocket Porting

Intake Valve

Test Diameter: 1.710 in
Pressure Drop: 28.0 inH2O
Valves Per Port: 1

Lift: inFlow: cfm

0.200

109.0

0.300

147.0

0.400

156.0

0.500

162.0

Exhaust Valve

Test Diameter: 1.490 in
Pressure Drop: 28.0 inH2O
Valves Per Port: 1

Lift: inFlow: cfm

0.200

95.0

0.300

123.0

0.400

133.0

0.500

138.0

CALCULATED POWER AND ENGINE PRESSURES

Engine RPM	Power (Fly) (HP)	Torque (Fly) (FT LB)	Power (Wheel) (HP)	Torque (Wheel) (FT LB)	Int Man Pressure (PSI)	Vol Eff %	BMEP Pressure (PSI)
1000	42	221	36	188	14.69	63.3	146.2
1500	74	258	63	219	14.68	68.1	170.6
2000	106	279	90	237	14.67	73.2	184.7
2500	133	279	113	237	14.64	74.3	184.4
3000	169	296	144	252	14.61	79.5	196.1
3500	195	293	166	249	14.56	80.8	194.0
4000	212	279	180	237	14.52	79.1	184.5
4500	220	257	187	218	14.48	75.9	169.8
5000	197	207	168	176	14.45	69.7	137.1
5500	170	163	145	138	14.44	63.2	107.6
6000	139	122	118	103	14.45	56.6	80.5
6500	103	83	88	71	14.46	50.2	55.2
7000	68	51	58	43	14.48	45.0	33.7
7500	27	19	23	16	14.50	39.5	12.7
8000	0	0	0	0	14.53	34.9	0.0
8500	0	0	0	0	14.55	30.4	0.0
9000	0	0	0	0	14.57	26.8	0.0
9500	0	0	0	0	14.59	23.3	0.0
10000	0	0	0	0	14.61	20.3	0.0
10500	0	0	0	0	14.62	17.8	0.0
11000	0	0	0	0	14.63	15.6	0.0
11500	0	0	0	0	14.64	13.6	0.0
12000	0	0	0	0	14.65	11.8	0.0
12500	0	0	0	0	14.66	10.1	0.0
13000	0	0	0	0	14.67	8.7	0.0
13500	0	0	0	0	14.68	7.6	0.0
14000	0	0	0	0	14.68	6.5	0.0
14500	0	0	0	0	14.68	5.5	0.0
Average Values (Set Range In Simulation Category):							
	148	164	126	139	14.48	62.2	108.3

PROTOOLS CALCULATED POWER AND ENGINE PRESSURES

Engine RPM	Power (Fly) (HP)	Indicated Power (HP)	Frictional Power (HP)	Pumping Power (HP)	Mech. Eff %	Induction Airflow (CFM)	Piston Force (LBS)	Piston Speed (FT/MIN)	IMEP Pressure (PSI)	FMEP Pressure (PSI)	PMEP Pressure (PSI)	Ignition Timing (deg)
1000	42	47	4	0	91.7	42.3	1808	567	159.5	12.6	0.6	17.5
1500	74	82	7	0	91.4	68.4	2116	850	186.5	14.9	1.1	19.1
2000	106	119	10	1	90.8	98.1	2307	1133	203.4	17.1	1.6	20.7
2500	133	150	14	2	89.7	124.3	2332	1417	205.6	19.2	2.1	22.3
3000	169	193	19	2	89.0	159.6	2498	1700	220.3	21.6	2.6	24.6
3500	195	226	24	3	87.8	189.4	2505	1983	220.9	23.8	3.1	26.0
4000	212	250	30	4	86.2	211.9	2427	2267	214.0	26.0	3.4	27.0
4500	220	265	37	5	84.1	228.6	2289	2550	201.8	28.4	3.6	27.3
5000	197	251	45	5	79.9	233.3	1945	2833	171.5	31.0	3.4	28.4
5500	170	232	54	5	74.4	232.8	1640	3117	144.6	33.9	3.2	29.1
6000	139	211	65	5	66.9	227.5	1366	3400	120.5	37.0	2.9	29.6
6500	103	186	77	5	56.2	218.6	1113	3683	98.2	40.5	2.6	29.8
7000	68	164	90	5	42.0	210.9	908	3967	80.1	44.2	2.2	29.9
7500	27	138	106	4	20.3	198.3	712	4250	62.8	48.2	1.9	30.1
8000	0	111	123	4	0.0	186.8	539	4533	47.5	52.4	1.5	30.7
8500	0	82	141	3	0.0	173.2	375	4817	33.1	57.0	1.1	31.0
9000	0	57	162	2	0.0	161.6	244	5100	21.5	61.8	0.8	31.3
9500	0	30	186	1	0.0	148.0	123	5383	10.8	66.9	0.4	31.4
10000	0	6	211	0	0.0	136.0	25	5667	2.2	72.1	0.1	31.5
10500	0	0	238	0	0.0	125.3	0	5950	0.0	77.6	0.0	31.5
11000	0	0	268	0	0.0	114.6	0	6233	0.0	83.3	0.0	31.6
11500	0	0	299	0	0.0	104.5	0	6517	0.0	89.1	0.0	31.7
12000	0	0	334	0	0.0	94.6	0	6800	0.0	95.2	0.0	31.7
12500	0	0	371	0	0.0	84.7	0	7083	0.0	101.5	0.0	31.8
13000	0	0	410	0	0.0	76.1	0	7367	0.0	108.0	0.0	31.8
13500	0	0	452	0	0.0	68.7	0	7650	0.0	114.7	0.0	31.9
14000	0	0	497	0	0.0	60.8	0	7933	0.0	121.6	0.0	32.0
14500	0	0	545	0	0.0	53.0	0	8217	0.0	128.7	0.0	32.0
Average Values (Set Range In Simulation Category):												
	148	214	59	5	66.4	216.8	1656	3117	146.0	34.8	2.9	28.6





