

## 2004 Carbureted F7 vs EFI

Here's where we are right now, struggling to match the output of the EFI F7. All runs shown are with normal operating temp, thermostat open. This is our first attempt to post raw SFD (SuperFlowData) along with our printed data. You can download the Windyne reader program from [www.superflow.com](http://www.superflow.com), and do your own graph comparisons, and see all observed and corrected data from tests. We'll try to post the SFD's later in the week.

Baseline dyno run was tried first with the hood membrane connected to the airbox. The slight negative pressure inside the airbox combined w/ carb vents outside made the engine too rich to run cleanly at 50 degrees F even though carbs were jetted down from 520 stock to 470's. So we disconnected the rubber inlet hose. Now the engine ran cleanly, with top end fuel flow lb/hr that would net 135 HP+ on EFI, but we're well shy of that.

### 04F7CBB 127.8 HP STOCK BASELINE.

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC lb/hph	Fuel B lb/hr	AirTmp degF
6000	73.5	84.1	0.76	62.6	55
6100	74.1	86.1	0.76	64.9	55
6200	75.4	89.1	0.77	67.5	55
6300	77.4	92.8	0.77	70.4	54
6400	77.9	94.9	0.76	71.4	54
6500	80.1	99.1	0.76	74.2	55
6600	81.3	102.2	0.74	74.6	55
6700	83.7	106.8	0.72	76.4	55
6800	84.3	109.2	0.72	77.1	55
6900	85.4	112.3	0.72	79.5	56
7000	84.8	113.1	0.73	81.9	56
7100	84.8	114.7	0.73	82.9	56
7200	83.6	114.6	0.76	85.8	56
7300	81.6	113.4	0.79	88.6	57
7400	81.6	115.1	0.78	88.3	57
7500	81.8	116.8	0.77	88.3	57
7600	88.3	127.8	0.69	87.1	56
7700	87.1	127.7	0.71	88.1	56
7800	84.4	125.4	0.71	87.7	56
7900	82.6	124.3	0.73	89.4	56

We noted that airflow CFM was much lower than what we've seen with EFI F7s. So we tried Bill LT DeFranco's 04 EFI muffler on the carbbed F7, identical part number, identical CFM and HP. Next we added a four degree offset timing key, which the engine liked, adding nearly 5 HP and more torque throughout the powerband. But please note that compared to EFI F7s the Ex Valves appear to opening too late, like we saw occur with the F6's tested earlier.

#### 04F7CBE 132.3 HP ADD 4 DEGREE TIMING KEY

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC lb/hph	Fuel B lb/hr	A/F Ratio	Air 2 scfm	AirTmp degF
6700	87.7	111.9	0.71	76.2	11.92	199	45
6800	87.5	113.3	0.72	79.2	11.54	200	45
6900	86.7	113.9	0.72	79.8	11.58	202	45
7000	86.5	115.3	0.72	80.6	11.64	205	45
7100	87.1	117.7	0.72	82.8	11.43	207	46
7200	85.5	117.2	0.71	81.3	11.72	208	46
7300	83.3	115.7	0.74	83.6	11.46	209	45
7400	83.5	117.6	0.73	83.7	11.45	209	45
7500	83.9	119.8	0.71	83.2	11.55	210	45
7600	90.1	130.3	0.67	85.1	11.73	218	45
7700	90.2	132.3	0.67	86.5	12.03	227	45
7800	83.5	124.1	0.72	86.4	12.03	227	45
7900	77.5	116.6	0.78	88.7	11.53	223	46
8000	65.6	99.8	0.94	90.7	11.18	222	46
8100	57.7	88.9	1.04	90.2	11.09	219	46

Dan from APC has seen the same low airflow on carbbed F7 and F8 Firecats. He discovered through his contacts at Cat that the choke is in the airbox boots that slide over the carb bells. DynoTechie John T. Cowie (deadsled1@hotmail.com) took the carbs and airbox adaptor to his shop. He spent several hours first removing the casting flashing ridge inside the carb bells right where the carbs fit the airbox boots. Then, he filled in the gaps inside the airbox adaptor between rubber boots and plastic box adaptor with some rubber cement-like goop. After that set up overnight, John blended the rubber/ plastic into a bell shape with a porting tool, matching the radius of the bells. Eliminating this seemingly minor but turbulence creating square inlet edge increased airflow about 10% (a bit higher than the CFM most of the stock EFI F7's have flowed), and interestingly caused fuel flow to drop. We had to jet up to 490s to get out optimal A/F ratio back. This added another 5 HP. But a 2 degree key and 12/1 AF on an EFI F7 usually nets us 142+ HP. So we're still missing 5 HP.

### 04F7CBI 137.6 HP PORT CARB ADAPTOR INLET

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC lb/hph	Fuel B lb/hr	A/F Ratio	Air1+2 scfm
6600	86.3	108.5	0.75	79.1	11.31	195.5
6700	87.1	111.2	0.75	81.2	11.17	198.1
6800	88.2	114.1	0.75	83.3	11.07	201.4
6900	88.7	116.5	0.77	87.1	10.79	205.1
7000	88.8	118.3	0.77	88.7	10.81	209.4
7100	88.1	118.9	0.77	89.4	10.84	211.7
7200	87.1	119.5	0.78	90.8	10.76	213.4
7300	86.1	119.5	0.77	89.8	11.08	217.4
7400	86.1	121.2	0.76	89.3	11.16	217.8
7500	86.1	122.8	0.74	89.1	11.24	218.5
7600	95.1	137.6	0.67	90.3	12.29	242.4
7700	93.9	137.6	0.69	92.1	12.19	245.3
7800	91.7	136.2	0.71	93.9	12.13	248.8

Since the carbureted F7 is now matching EFI airflow, and mixture is perfect at 12/1, we think we need to add a bunch more timing to match the EFI F7's top end HP. For your graphic comparison, here is Jon Schaefer's stock EFI F7, with '04 ECU, leaned out top end fuel pressure and 2 degree key. Note that the lean EFI midrange makes less HP than our more correctly fueled carbed F7 at low RPM. But the EFI ECU opens the Exhaust valves earlier—note how the carbed F7's power flatlines until the valves open several hundred revs too late.

### 04F7JC08 142.1 HP WELL TUNED EFI F7 FOR COMPARISON

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC lb/hph	Fuel A lb/hr	A/F Ratio	Air 2 scfm	AirTmp degF
5900	70.6	79.3	0.71	54.3	14.75	175	41
6000	71.1	81.3	0.71	55.1	14.52	175	41
6100	72.7	84.4	0.67	54.8	14.53	174	41
6200	73.8	87.2	0.66	55.1	14.59	176	41
6300	76.4	91.7	0.63	55.5	14.78	179	40
6400	77.7	94.6	0.62	57.1	14.62	182	40
6500	80.1	99.1	0.62	58.8	14.48	186	41
6600	81.1	101.8	0.61	59.4	14.59	189	40
6700	83.7	106.7	0.61	61.6	14.41	194	40
6800	85.3	110.4	0.61	63.8	14.45	201	40
6900	85.9	112.9	0.61	65.4	14.45	206	41
7000	87.1	115.9	0.61	67.2	14.26	209	41
7100	88.1	119.1	0.59	68.3	14.36	214	42
7200	88.1	120.8	0.59	68.9	14.36	216	41

7300	90.1	125.1	0.61	73.2	13.81	221	41
7400	96.3	135.6	0.65	84.8	12.76	236	42
7500	96.5	137.8	0.68	90.8	12.12	241	42
7600	96.9	140.2	0.69	93.8	11.97	245	41
7700	96.9	142.1	0.69	93.9	11.96	245	42
7800	94.7	140.7	0.71	95.2	11.76	245	43
7900	90.1	135.5	0.74	96.6	11.54	244	43

Our plan now is to have Carl McQuillen EDM a new keyway in the flywheel, 180 degrees from the original slot, plus maybe 4 degrees to add to our 4 degree keyway for a total of 8 (!!!) over stock. This should get us our 140+, but our concern is that the added timing will shove the power peak lower, perhaps occurring just as the late-opening exhaust valves snap open, making the new powercurve too cantankerous for clutching or pleasant driving. More on that as soon as we crank the timing some more.



