

Figure 2				RUN 1			RUN 2			RUN 3		
RPM	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)	POWER (Horsepower)	CO (Percent)	SFC (lb./hp.-hr.)	RPM		
IDLE	—	1.6	—	—	1.6	—	—	0.8	—	IDLE		
3500	35.5	5.2	.50	35.7	7.4	.54	35.5	2.9	.47	3500		
4000	41.5	6.2	.50	41.3	7.8	.52	41.5	3.9	.48	4000		
4500	47.7	7.6	.50	47.5	9.1	.53	48.2	4.7	.48	4500		
5000	53.8	8.0	.51	53.5	9.5	.54	54.2	5.2	.49	5000		
5500	59.4	9.6	.54	58.8	10.0	.56	59.3	7.0	.51	5500		
6000	67.7	9.2	.53	68.1	10.0	.55	67.8	7.0	.51	6000		
6500	75.5	8.6	.52	75.5	9.4	.52	76.1	5.9	.50	6500		
7000	80.9	9.0	.53	80.6	9.6	.56	81.0	6.8	.46	7000		
7500	85.7	9.2	.53	85.4	9.8	.57	86.8	7.0	.49	7500		
8000	90.8	9.2	.55	90.8	9.6	.55	91.3	7.4	.53	8000		
8500	92.6	9.4	.56	92.6	10.0	.58	93.3	7.2	.54	8500		
9000	90.9	9.6	.59	90.6	10.0	.59	92.6	7.6	.54	9000		

1) Stock—Baseline 2) K&N stock replacement filter 3) No filter element

In Search of the Free Lunch

could have come from less intake restriction, or from the mixture being closer to ideal with the reduced restriction, or some combination of these factors.

After three days of thrashing two GS1100's on the dyno, we could draw the following conclusions: As expected, carburetion is much more sensitive to changes to the intake system than to exhaust system changes. Aftermarket exhaust pipes, at least those fitted with baffles intended to work with stock jetting, do work fairly well, but don't give enormous horsepower increases. There is horsepower to be found in airbox modifications, but unless you're willing to spend time and money making the carburetors carburet, you may turn a good running motorcycle into a staggering pile. Stock replacement air filters may not offer any power gains, but may have other advantages, such as being cleanable.

Because the dyno doesn't reflect all real world conditions, and to confirm the results obtained so far, we continued our testing at the drag strip and on the street. The drag strip isn't the ideal place to judge full range carburetion; all that's required for a good quarter-mile time is an engine running well enough to get a good launch and with good power over the top 25 percent of the power band. But it is a performance standard, and should correlate well with the horsepower measurements from the dyno. Street riding would be even more telling.

Our first visit to the drag strip was with the Yamaha 650. Running with first the stock air filter, then a K&N stock replacement air filter, and finally no air filter element at all, the Yamaha produced three almost identical quarter-mile times (see fig. 3). Removing the airbox made the bike unrideable. Because jets for the Hitachi carburetors used on the Yamaha are as likely to be

found in the local stereo store as in a motorcycle dealership, the airbox was reinstalled. Because we hadn't found an exhaust system that fit, that was the end of the quarter-mile testing with the Yamaha.

Our next trip to the strip was with the GS1100, the fresh one we had borrowed from Suzuki, not the one that had been used for the first set of dyno runs. Our best base line run for this stock machine was 11.30 sec. at 119.36 mph. With the addition of the Kerker KR pipe, the best time dropped by 0.17 sec. and the speed increased by 3.08 mph. This improvement can be attributed to both the slight increase in top end power seen on the dyno, and the weight decrease of 28 lb. that came with the Kerker installation and the removal of the center stand. Before we could experiment with airbox modifications, rain soaked the track and ended testing for the day.

When we came back to the track, we made three runs for each of the following combinations: (1) stock, (2) Kerker KR 4-into-1 pipe and stock jetting, (3) Kerker pipe, airbox lid off, and 122.5 main jets, and (4) Kerker pipe, airbox removed, individual K&N air filters, and jetting as used in the dyno test except the needles were .080 in. lower (due to incorrect positioning of the nylon washer) and 170 mainjets. The best time in each category is shown in fig. 3. The baseline time was slightly better than in the earlier runs, and the time with just the Kerker pipe was also slightly better, while the mph was down. Removing the airbox lid and installing the 122.5 main jets failed to improve quarter-mile performance, and the individual K&Ns with the jetting we tried were a disaster. With the needle in the lowered position, and with 30 pilot jets, the low range carburetion was so lean the motorcycle would only run at low speed with the choke on. John

Ulrich managed the quarter-mile time shown for this combination by simultaneously tweaking the choke lever and the throttle. While this didn't give a very good launch, top end power was strong enough to push the motorcycle through the quarter in 11.42 sec. at 119.56 mph.

What had we learned from the quarter mile testing? The runs with the Yamaha indicated there wasn't much power difference between stock and aftermarket stock replacement air filters, which was the same result the dyno had shown for the GS1100. The 4-into-1 pipe on the GS1100 yielded slight improvements in performance, while opening the air box and jetting up didn't work as well on the track as the dyno. This may be because the jets used in the first GS1100 on the dyno on a hot day weren't optimum for the second GS1100 on a cooler, denser day. The individual K&Ns showed some promise with a good terminal speed considering the horrible launch, but this combination obviously needed more work on the carburetion.

Both the Yamaha and GS1100 were ridden regularly on the street when we weren't at the drag strip, and subjective impressions tended to confirm earlier results. There was no difference in the way the Seca 650 ran with either the stock or the stock replacement air filter. The GS1100 with Kerker pipe didn't run noticeably differently than with the stock exhaust, except for the noise level and a slightly longer warm up period from cold. Removing the airbox lid and installing the 122.5 main jets increased induction noise, but didn't affect the motorcycle's driveability or perceived acceleration.

After the second drag strip session, the GS1100 was brought back to the office in a truck and we set out to make the bike streetable. The individual air filters were left on, and the needles were moved up to