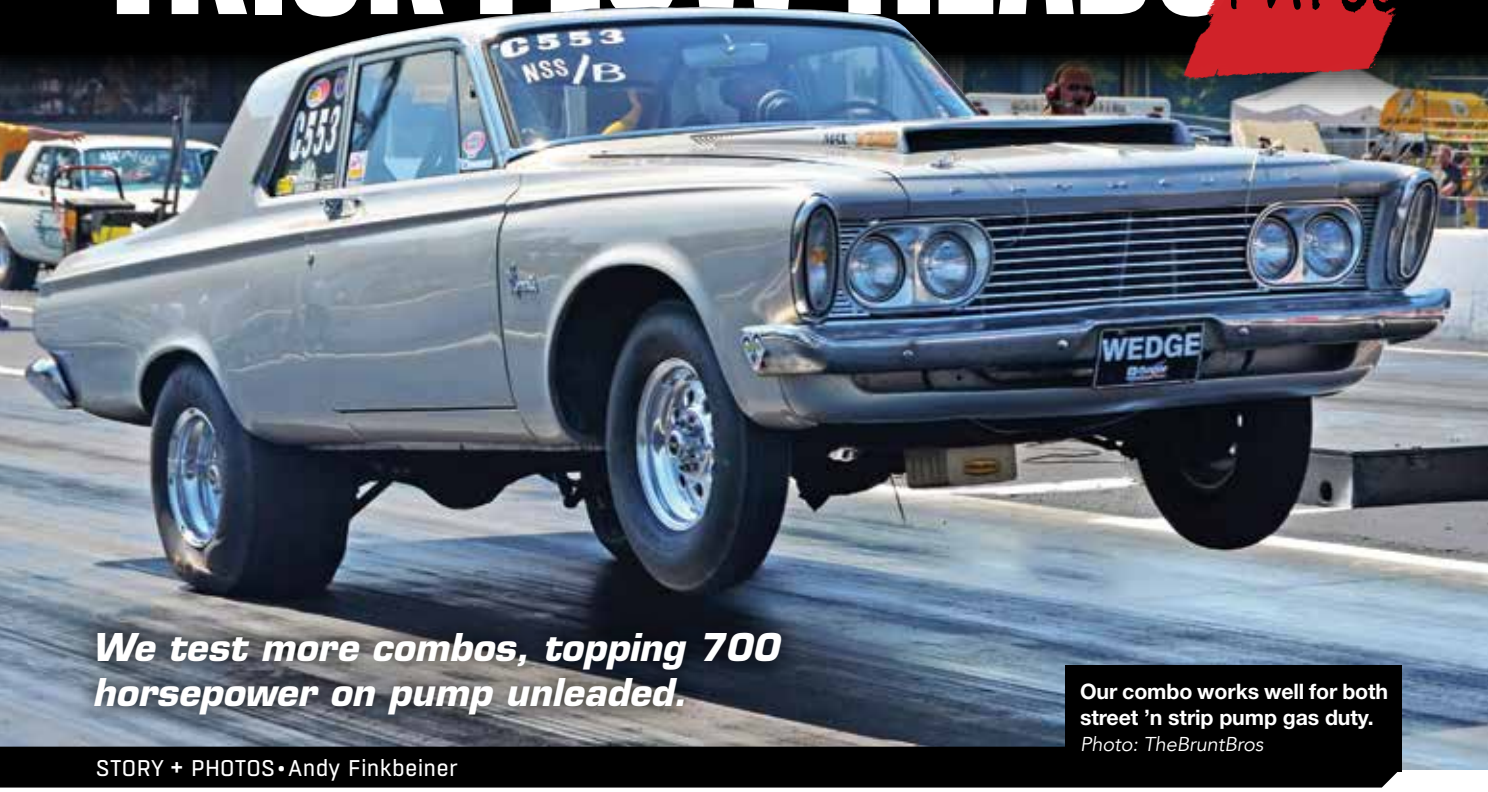
TRICK FLOW HEADS Part Three



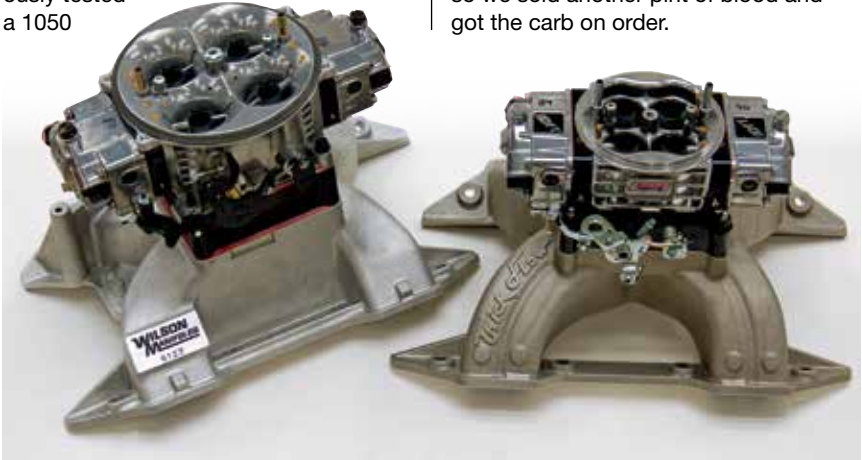
We test more combos, topping 700 horsepower on pump unleaded.

Our combo works well for both street 'n strip pump gas duty. *Photo: TheBruntBros*

STORY + PHOTOS • Andy Finkbeiner

Back in our last (August '16) issue we covered the first round of dyno testing for our pump gas 470 engine. We tried three different carbs and three different cams and saw a best of 685 hp using a Comp camshaft and a Mopar M1 4500 intake. After that dyno session was finished we spent some time thinking about the results and where the next possible improvements could come from. We decided to stay with the custom Comp roller cam since it seemed to be working really well, but we wanted to have the intake manifold ported since it appeared to be the cork in the system.

Our conclusion that the M1 intake was the cork was based on the fact that hp numbers didn't peak at a higher rpm when testing the hairier camshaft. If the camshaft wasn't controlling where the peak rpm was then the next likely suspect is the intake manifold (we are pretty sure that the exhaust system is fine since it has been used on higher power engines than this one). Given that, the Mopar M1 intake was pulled off the engine and sent to Wilson Manifolds for a full competition port job. While the intake was out for porting we talked to Holley about trying one of their new 950 cfm Dominator carbs. We had previously tested a 1050 Dominator on this engine but the engine was only using 860 cfm at full throttle so we thought a 950 Dominator might be worth testing. Our contact at Holley thought that sounded like a good idea so we sold another pint of blood and got the carb on order.



For the third round of dyno tests we lined up one of the brand new intakes from Trick Flow as well as a Wilson modified Mopar M1 4500 intake. We topped them off with a 950 Dominator and a 1050 Quick Fuel carb.

1. Wilson did a fantastic job porting our M1 intake. The runners were opened up significantly and the entire interior was given a uniform surface finish.

2. The runners in the M1 intake were widened and the roof was raised. Wilson welded material to the outside of the runners in order to have enough room to widen the runners to the size they needed to be for this engine.

3. The runners are now large enough that the port alignment can be seen by looking down the plenum.

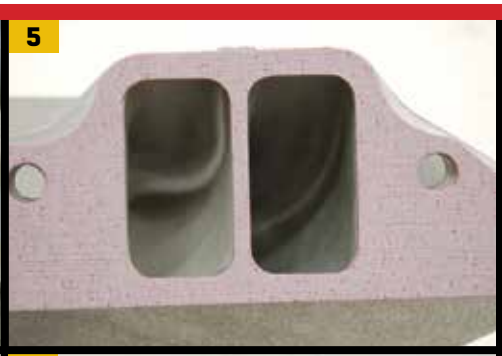
4. We measured the volume of the various intakes by weighing the water required to fill the intake. The unported Mopar 4500 intake was 192 cubic inches. The Trick Flow intake was 199 cubic inches while the Wilson intake took 213 cubic inches of water.

5. Wilson matched the ports to the gaskets which are an exact match to the CNC ports in the Trick Flow head. The runners were not bellmouthed to the gasket. The runners were enlarged all the way back to the plenum.

6. For this round of testing we acquired a 950 cfm Dominator part number 80901. This 950 is one of the new Gen 3 Dominators that Holley has recently released. These carbs have larger fuel bowls, idle air bypass, billet metering blocks and relocated air bleeds.

7. The venturi size in the 950 is identical to a 1050, the only difference is the 950 has small skirts on the base of the boosters. These small skirts reduce the airflow through the carb which is why the CFM rating is reduced, but probably improve atomization at lower flows.

8. We used a two inch tall merge type spacer on the dyno per Wilson's recommendation. The merge spacers almost always make more peak power over an open or four-hole type spacer.



About this same time we received a note from Trick Flow saying that they had brand new big block Mopar intake manifolds ready to ship. These new Trick Flow intakes are single-plane racing designs with curved runners and a 4150 bolt pattern. Trick Flow has intakes for both RB and B blocks so we raised our hand for a B version. Once we had the Trick Flow intake in our hands it looked like it was going to flow a lot of air, so we decided to get a bigger 4150 carb. Last time out we ran both 850 and 950 carbs but Quick Fuel has a 1050 cfm carb that bolts to a 4150 pattern intake manifold. We decided to add one of those to our arsenal. We ordered the Quick Fuel carb with annular boosters since we had seen such good results during previous tests with the annular design. After all the horse trading was over we ended up with the Trick Flow 4150 intake as well as the ported M1 4500 intake and we have 950 and 1050 cfm carbs for each intake.

Showing up at the dyno shop with multiple intake manifolds and several boxes of carbs always makes the dyno operator wince a bit since he knows it will be a long day of swapping parts and making pulls. Running a test like generates some chaos as we double check temps and pressures before each run then read off the data after the pulls and make decisions on what to do next. Fortunately, after a few years of experience running these tests, everyone knows what to do and when to do it.

Our testing went very smoothly this time with no major problems. The screen type oil filter (easy to inspect, but not recommended for street use) has been

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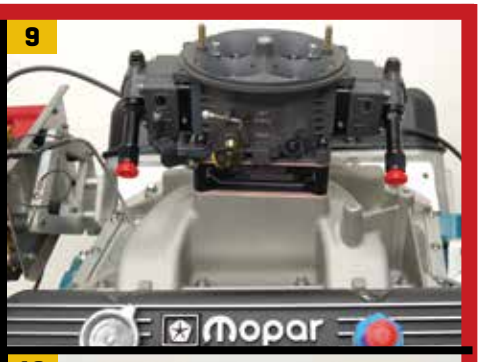

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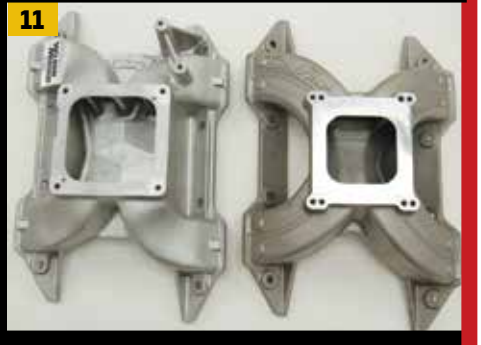
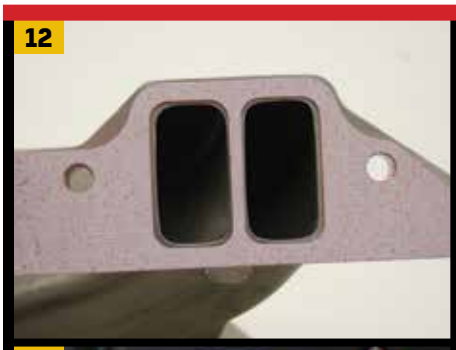


9. We also tried a 1050 Dominator on the dyno and it made roughly 10 hp more than the 950 Dominator. This 470 inch engine has made more peak power every time we increase the size of the carb but undoubtedly there is a limit to this trend.

10. The new intake from Trick Flow looks great. The casting finish is excellent and the runners form a smooth U shape rather than the older X-type design. The curved runners allow more room for the inner bolts and create a straighter shot into the cylinder head. This intake weighs 10.5 pounds and is 5.7 inches tall.

11. A side by side shot of the Mopar 4500 intake with the Trick Flow intake shows a big difference in plenum size. The Mopar intake has extra webbing material and it includes a completely useless coil mount. Not sure what the Mopar engineers were thinking, there is no room for a coil once a Dominator carb is bolted in place.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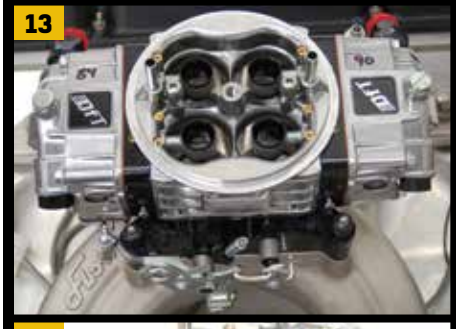
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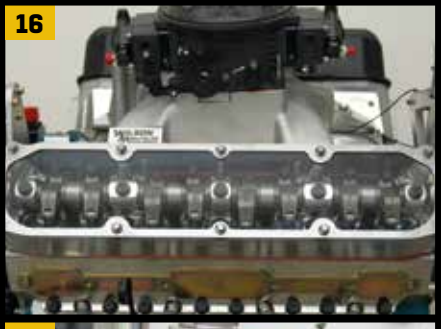
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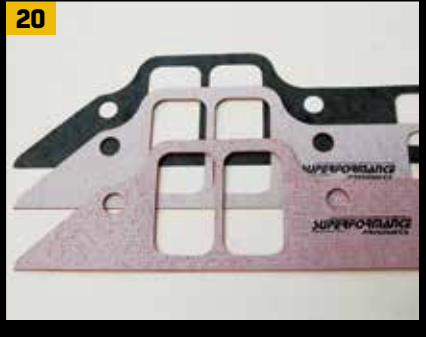
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12. Right out of the box the Trick Flow intake has a decent port match but it isn't perfect. Too bad Trick Flow doesn't run a simple CNC port match program on these intakes. They have the port dimensions from their cylinder heads so it would be easy for them to match the intakes to the head.

13. We worked with the folks at Quick Fuel to come up with the best carb for this round of dyno tests. Given the amount of power that the engine is making they suggested a race version of their 1050 main body with annual boosters. Part number is RQ-1050-AN.

14. The jets on the secondary side of the Quick Fuel are extended to the rear of the fuel bowl in anticipation of high G launches at the drag strip. This feature isn't required on the dyno but it doesn't hurt anything so we left the extensions in place.

15 The billet metering blocks on the Quick Fuel carbs have 5 emulsion jets which can be changed to adjust the beginning of the fuel curve. We reduced the size of the idle jet (the screwdriver is pointing at the idle jet) by a couple of sizes in order to lean out the engine at fast idle.

16. We built a billet valve cover with a clear polycarbonate top so we could keep an eye on the valvetrain. The clear cover allows us to quickly see that everything is getting oil and that nothing is turning blue from the heat.

17. Back on the dyno again. This engine now has about 40 dyno pulls and we still have additional testing to do before we're satisfied. The #12 black hose coming off the passenger side valve cover connects to a blowby meter. The custom dyno headers are 2-inch units built by Jere Stahl a few years back.

18. The Trick Flow intake was topped off with a one-inch Trick Flow merge spacer and the 1050 Quick Fuel carb. The clear valve cover top gets coated with oil when the engine is running but clears up quickly when the engine is shut off. The Trick Flow valve springs have worked perfectly so far and we've been throwing plenty of lift and RPM at them.

19. We are still struggling to get perfect alignment on the intake gasket. It looks like we might need to build a pair of spacers to sit on the valley rails to raise the gasket on both ends. During teardown we saw that the gaskets and intakes were pulled down slightly so the airflow along the floor of the intake had been hitting a small ledge at the face of the head.

20. Unlike some other brands we've tried, the Superformance gaskets line up properly with the Trick Flow ports. The Superformance intake gaskets are available in three thicknesses, 0.015, 0.031 and 0.062" so you can compensate for differences in deck height and manifold width. Superformance gaskets can be purchased from either Hughes Engines or Mancini Racing.

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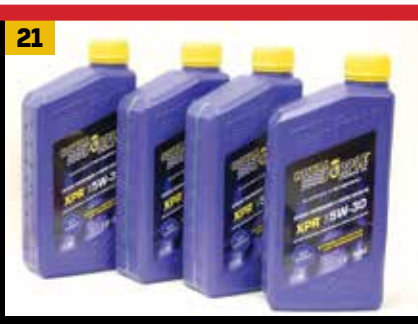

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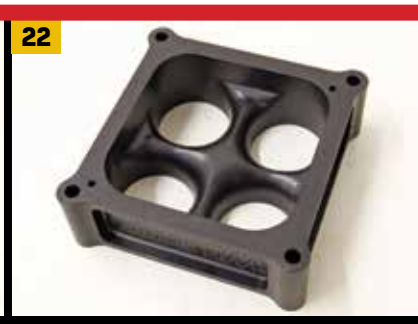

21. For this round of dyno tests we drained out the 10W-40 break-in oil that we had been running and replaced it with 7 quarts of 5W-30 Royal Purple synthetic. The change to the less viscous Royal Purple oil reduced the oil pressure at full throttle by roughly 5 pounds but unquestionably this change reduces HP lost to windage. After the oil change the engine held 65 psi at 6500 rpm with an oil temp of 180 degrees. For this round of tests we used a standard Melling HV pump with the black spring.

22. Wilson recommended that we use their 2-inch merge type spacer with the ported intake. The Wilson spacers are fully machined inside and out for reduced weight and excellent performance.

free of debris after every pull which is excellent news. The weather was just about perfect for dyno testing with the temperature in the 60s, low humidity and average barometric pressure. Conditions like that gave us a low correction factor of 1.03 (3% correction) which is well within testing and documentation norms.

First up on the dyno was the new Trick Flow intake manifold topped off by the 1050 cfm Quick Fuel carb. These were both new parts for us but they worked super well together delivering peak values of 690 hp at 6500 rpm and 610 ft-lbs at 5500 rpm. Last time out we saw a peak of 664 hp using a 4150 carb so this new combination of parts added 26 hp. 690 hp is enough power to put an A-body car into the 9s if you can get it to hook up so we're starting to make some *serious* power on pump premium.

After seeing the excellent results with the Trick Flow intake we were anxious to see how the ported M1 intake would perform. We bolted the Wilson modified intake in place with the 950 Dominator carb for the next round of testing. The engine picked up another 13 hp to take us to 703 hp at 6200 rpm and 626 ft-lbs of torque at 5500 rpm. We still had the 1050 Dominator from our last test so it went back on to see if the engine would respond to even more airflow. With the 1050 in place the engine pulled an all-time best of 715 hp while peak torque stayed the same at 626 ft-lbs. Our previous best with the un-ported intake was 686 hp so the intake porting gained us 29 hp.

Over the past three issues we've picked up 55 hp from our first pulls in the 660 range to the current peak at 715 hp. We changed the cam, carb and intake to find that power but we never had to touch the heads. We still have a few ideas on how to find even more power with these heads but it might take us some time to make it happen. If we're able to find that power we'll come back and show you how we did it. But for now we've proven that the Trick Flow heads are more than capable of 700 hp right out of the box. So pick up a set and go smoke a Chevy.

SOURCES

GRAY'S AUTOMOTIVE
McMinnville, OR
503-620-4353
www.graysengines.com

HOLLEY
Bowling Green, KY
866-464-6553
www.holley.com

TRICK FLOW
Tallmadge, OH
330-630-1555
www.trickflow.com

QUICK FUEL TECHNOLOGY
Bowling Green, KY
270-793-0900
www.quickfueltechnology.com

WILSON MANIFOLDS
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954-771-6216
www.wilsonmanifolds.com