

Power Development

Testing Popular Power Product Combinations



Truck owners are constantly searching for inexpensive ways to gain more power from their vehicles. With an abundance of aftermarket parts, finding the right combination is sometimes difficult. Knowing which throttle body spacer and cat-back exhaust system will deliver the most power for your truck is the subject of many debates and questions on forums in the TEN websites. Among the many products that are discussed among truck owners, a few pop out as some of the most common. These are air intake systems, power programmers, throttle body spacers, headers and a cat-back exhaust system.

These five products are the most common that truck enthusiasts change to improve horsepower and torque. If you look at many manufacturer's ads however, it might seem that you would be in-

stalling nearly 50 horsepower. Some ads claim eight to 10 horsepower for a throttle body spacer, 15 horsepower for an air intake system, another 10 to 15 horsepower for a power programmer and 20 horsepower for adding a combination of a header and exhaust.

The fact is that not all products work the same on every make, model and year truck. They also work differently on various engines; some responding better to these modifications than others. Although we could never exactly find out what combinations work for every truck, we can gather some of these components and put them to the test and see what kinds of results we can achieve.

The plan was to get some of these popular bolt-on products from a retailer, install them and perform one before and one after dyno test to

see the results. We asked for some help from Dealer's Sport Trucks in Los Alamitos, California, who would provide the products off of their shelves and install them onto a test vehicle. In this case, it was a Ford F-150 pickup with a 5.4-liter V-8 engine. The parts that were installed are the top ranking products that were accessed by millions of truck enthusiasts and included an Airaid high-flow air intake system and throttle body spacer, a Gibson header and SuperTruck cat-back system, and a Hypertech Power Programmer.

To determine any increase in before and after performance, we used the Super Flow dynamometer at Westech Performance in Mira Loma, California. The baseline average for the 5.4 in stock condition was around 206 horsepower to the rear wheels and 303 lbs.-ft. of torque at slightly above the 4700 rpm range.

Dyno Results

Short runs on Super Flow chassis dyno, both done in second gear.

Stock Baseline Dyno Run 5.4-Liter V-8

RPM	Corrected HP	Corrected TQ
3653	215.4	309.7
4751	206.2	227.9

Power Combination Installed

RPM	Corrected HP	Corrected TQ
3269	200.8	325.6
3362	216.7	338.6
3486	222.9	335.7
3612	223.6	325.1
3723	227.0	320.3
3859	226.2	307.8
3984	229.3	302.2
4096	228.5	293.1
4214	230.2	286.9
4340	229.5	277.8
4441	226.9	268.3
4549	224.0	258.6
4653	224.7	253.6
4753	221.0	244.2
4849	216.8	234.8
4940	212.3	225.7
5025	207.2	216.5

The next step was to install all of the products Dealer's selected for the F-150. The Airaid intake was incredibly simple to install and came complete with hardware that enabled Dealer's technicians to install this in a matter of minutes. The Gibson exhaust system was a little more difficult, as the truck's complete exhaust had to be removed. The Gibson shorty-style, stainless steel headers fit nicely into the truck's engine compartment and were easily bolted onto the factory heads. The cat-back system also bolted on with out any problems and exits out in front of the passenger tire with two 2-1/2 inch chromed tips.

Finally, the Hypertech Power Programmer was installed, downloading new fuel and timing tables to the factory computer. Once all of the work was completed, the truck was driven around for about a week, giving the computer more than enough time to learn and recalibrate itself with the combination of products. With the truck back on the Westech Super Flow Dyno, the horsepower numbers showed that the truck had a peak increase of 24 horsepower and 35 lbs.-ft. of torque. On average, the products produced 20 horsepower and 25 lbs.-ft. of torque across the entire rpm range, making this combination a relatively good choice.

Some of us were speculating what each component would do on the dyno by itself and we've witnessed the results before on many other tests. Sometimes there's no difference with an air intake, or large differences in exhaust and so on. The results are always varied and change when adding more complimentary components. As with any one system, be it an intake or a computer programmer, they often work better in combination with other components like we've seen here.

So what did it cost to get 25 more rear-wheel horsepower from our test subject? The total of parts alone came to \$1,388. This may sound like a lot of money, but keep in mind that the engine now produces about 25 more horsepower and torque from idle to about 5,000 rpm, which makes it very useable and is a noticeable difference. Also consider the fact that this type of horsepower comes from making the engine more efficient, meaning increased fuel economy is also a side benefit. Another benefit is the improved shifting from the Power Programmer and with all of that, the price seems like a good bargain.

By Joe Moxie
Photography: Jim Harmon and Dani Sanchez

Sources

Hypertech

3215 Appling Rd.
Bartlett, TN 38133
901-382-8888

Gibson Performance Exhaust

1270 Webb Circle
Corona, CA 92879
800-528-3044

AirAid Filters/ PowerAid Throttle Body Spacers

14840 N. 74th St.
Scottsdale, AZ 85260
800-498-6951

Dealers Sweet Truck

3938 Cerritos Ave
Los Alamitos, CA 90720
562-936-1230

Westech Performance

11098 Venture Dr.
Mira Loma, Ca 91752
909-685-4767

COMPONENT COSTS

Gibson Headers ----- \$449
Gibson Super Truck Cat-Back -- \$289
Hypertech Power Programmer -- \$329
Airaid Intake System ----- \$232
Airaid Throttle Body Spacer ---- \$89



Our Airaid Power Aid throttle body spacer came with instructions, new bolts and gaskets to install the new spacer in just a few short minutes. The other parts included are for moving the cables further out from the engine to maintain proper tension and spacing with the new spacer in place.



The Airaid high performance air intake system was a complete unit for our Ford. The tube is made of high strength plastic polymer and coupled with a high flow filter and the new air horn base to get the air flowing in the proper direction and orientation down the intake pipe.



With our stock Ford engine, the technicians began to install these products onto their F-150 project truck.

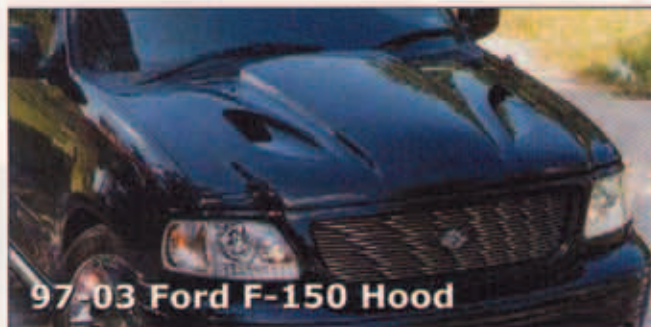


The first item for removal was the stock air intake system. Make sure to have a clean and clear work bench because you will have a lot of parts to work with from the stock system.

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POWER

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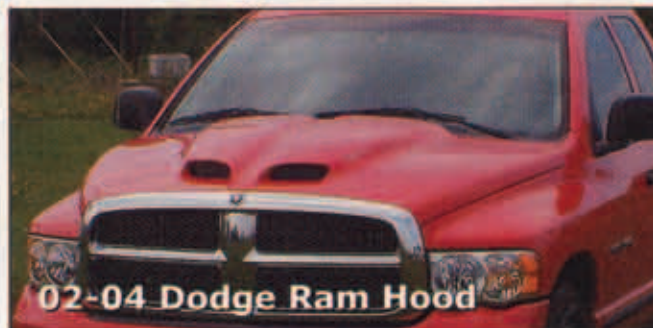
97-03 Ford F-150 Hood



98-04 Ford Super Duty Hood



88-98 Chevy / GMC Hood



02-04 Dodge Ram Hood

5



With the stock air intake system out of the way, the four bolts holding the throttle body onto the intake manifold are removed.

6



With the spacer and new gaskets in place, longer throttle body bolts are used from the kit.

7



Because the throttle body is now 1/2-inch further away from the intake manifold, we need to move the throttle cables the same amount of space. The Power Aid kit comes with three brackets to accomplish this task in no time.

8



With our throttle body spacer installed, the new air intake system was next. The mass air flow sensor is removed from the stock system and attached to the base of the new filter and air horn.

9



Once this was done, the new air intake pipe is attached to the throttle body and then the filter to the end of the tube.

10



Once the filter and tube were tightened up and checked, the air temperature sensor and mass air flow sensors are reattached.

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The stock exhaust tubes from behind the muffler were removed to install the new system.



Before any cuts were made, the Dealer's technicians measured to determine how much to cut off with the muffler to allow for the side exhaust tubes to exit in the proper place.



One of the hardest parts on an exhaust install is removing the stock rubber isolators. Dealer's technicians found that a little spray with WD-40 just before trying to pull the isolators off their metal mounts, makes it go a lot easier.

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With the factory exhaust off, the new Super Truck muffler is put in place.



15

With the set up on this truck, they ran the exhaust tubes below the springs.



16

Once the muffler was welded onto the pipe a set of matching chrome tips were added to the exhaust tubes. The system comes with square tips but Dealer's wanted round ones for this truck.



17

The other part of the performance exhaust was to replace the restrictive manifolds with the Gibson Performance tubular headers.



18

The stock exhaust manifolds are installed with nuts on studs. To get the stock manifolds off, we first had to remove the nuts.

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Once the nuts were removed, the studs were broken loose gently by hand with a ratchet. Then air tools were used to pull them out the rest of the way. This is a good way to avoid having to drill out the stud from the block.

20



The new Gibson Performance headers have a more balanced tube set up than the stock exhaust manifold. To aid in the installation of the headers on the engine, Gibson designed the holes in the header flanges with slots. This allows you to easily slide the header onto just a couple bolts and hang there while you are starting the other bolts.

21



Make sure to treat all bolts with a threading compound, including the new header bolts before you put them back in.

22



Once the header bolts were started, they were tightened with the air ratchet and then torqued to the proper specs.

23



The collector flange of the headers mates up with the stock exhaust flange perfectly. Due to space limitations, the bolts go into the flange from opposite sides, but still pull it together tightly.

24



With all the mods completed, under the truck, the Hypertech programming system was next on the list. The step by step instructions were simple to follow.

25



Once we read through the instructions and input the data about the truck the programmer was ready to download its recalibrated info.

26



Attach end of the Hypertech plug to outlet port under the dash.

27



Once we were connected up to the truck's computer, the Hypertech programmer takes over.

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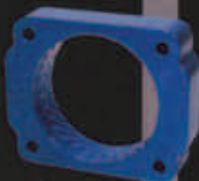
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With all of the performance products bolted onto the engine, we gained an average of 10 horsepower across the rpm range and a peak of 25 horsepower.

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All of the dyno testing was done with the hood open and careful air temperature measurements were taken.