

## EXHAUST SUGGESTIONS

The '61-'71 Dodge Truck Website / Hot Rod Magazine

Listed here are a few suggestions for a solid, high performance exhaust system. This article is titled "Testing The Effectiveness Of Performance Exhaust Components" and was adapted from the July 1995 issue of HOT ROD Magazine.

Testing the Effectiveness Of Performance Exhaust Components from Hot Rod Magazine

Of the elements that make up the four-stroke cycle, the exhaust is the last part of the equation, and it also represents the end of an engine's ability to make power. Once the exhaust gas leaves the combustion chamber, it's the exhaust system's job to make sure it gets out fast and stays out. That's why headers, decent-sized exhaust pipes and good mufflers are necessary on high-performance vehicles to get the garbage out and make room for more power. But at what point are headers needed? When are a stock single exhaust and factory muffler choking the engine, inhibiting horsepower? That's what we intend to show here.

To test the effectiveness of equipment that allows better exhalation, we hooked an engine up to Flowmaster's state-of-the-art dyno and tested it with various exhaust systems. We started with stock, cast-iron manifolds, wimpy 2-inch exhaust pipes and stock mufflers, and ended up with a high performance system using headers and unrestrictive mufflers. Are there any drawbacks to these systems? Sure, as with anything that improves performance, there may be some compromises, and we'll talk about that as well. But in most cases, the benefits far outweigh the disadvantages.

### ENGINE DETAILS

The test engine is about as stock as you can get: a GM Goodwrench 350 replacement motor. Its compression ratio of 7.8:1 and small-valve heads are not what we'd consider "performance" items, but this will illustrate what benefits can be realized by using good exhaust components on a stock engine. The 350 was topped with a cast-iron intake with a functional heat crossover, a Q-jet carb and an HEI distributor. The only concession to performance was in the cam, but it's a mild RV grind designed for low-rpm torque. During all tests, the engine ran on 92-octane gas, and the horsepower and torque were corrected for 29.92 inches of mercury and 60-degree dry air, which is the standard correction factor for all legitimate dyno tests. In each case, the engine was tuned for peak power, which is necessary any time a performance-enhancing part is added.

#### TEST 1 - STOCK

For a baseline, we wanted a combination representative of a bone-stock car, as you'd buy it from the elderly couple next door. A set of stock manifolds with 1 7/8 inch outlets was bolted to the 350, which dumps into a full-length exhaust system consisting of dual 2-inch pipes and two stock-type

mufflers with 2-inch inlets and outlets. Actually, many cars came stock with both manifolds connected to a single exhaust pipe and muffler, which probably would have lowered our baseline power numbers, but for testing purposes we thought a stock dual exhaust would be more representative. The engine peaked at 240 horsepower at 4500 rpm and 331 lbs-ft of torque at 3250.

#### TEST 2 - FLOWMASTER MUFFLERS

The easiest modification to make to the exhaust system is to add performance mufflers, so for test two we replaced the stock muffs with a pair of 2-inch Flowmaster Pressure Buster mufflers. Besides sounding healthier, the mufflers alone were worth 8 horsepower, to 248, and moved the power peak up 250 rpm to 4750. Torque increased only two lbs-ft at the peak, but the mufflers were worth up to 10 lbs-ft at higher rpm (see chart).

#### TEST 3 - HEDMAN HEDDERS

After mufflers, the next most popular upgrade is a set of headers. For more in-depth information on how header design, pipe diameter and length affect horsepower, check out "How It Works" in the March '95 issue of HOT ROD. For our stocker dyno mule, we bolted on a set of Hedman Hedders with 1 5/8 inch primaries, and backed them up with a bigger, 2 1/2-inch dual exhaust with 2 1/2-inch Pressure Busters. Why didn't we try the headers with the 2-inch exhaust? Because when going to headers, you'll have to change at least the first half of the exhaust system to make them fit, so you might as well get bigger pipes while you're spending the money.

These changes netted a difference you can actually feel when you floor the pedal. Power increased across the board, with an increase of 16 horsepower at the peak. **Torque also improved by 21 lbs-ft, from 333 to 354.** But more importantly, **the headers lowered the peak torque rpm by 25. So much for the belief that headers only help at higher rpm.**

#### TEST 4 - H PIPE

An H-pipe, also known as a crossover pipe, connects both sides of a dual exhaust. Theoretically, this equalizes the pressure in the pipe which helps them scavenge the cylinders more efficiently. It also helps get rid of some of the annoying resonance and frequencies that can occur in dual-exhaust system. Kevin McClelland at Flowmaster believes that the crossover pipe should be as close to the engine as possible, and of the same diameter as the rest of the exhaust, we installed the 2 1/2-inch crossover just after of the header collectors. Interestingly, this modification picked up horsepower and torque throughout the powerband, but lost a few lbs-ft the torque peak. It also raised the torque peak 250 rpm. While this test might not seem conclusive, in our experience a crossover pipe is worth it if for no other reason than the decreased resonance or drumming that reaches the inside of the car.

## TEST 5 - OPEN HEADERS

Drag racers always run with open headers, so that must mean that even a good exhaust system still costs power, right? Not necessarily. True, with engines that spin past 7000 rpm and make over 500 horsepower, an inadequate exhaust might pose a restriction. But even a healthy engine (400 horsepower or so) can benefit from a good exhaust system, and so can the stocker we flogged on the dyno. Horsepower and torque were hurt by opening up the headers, and the peak horsepower even dropped by one. And remember, that's after tuning for the change.

### CONCLUSIONS / Table of Dyno Figures

Test	1 Stock		2 Muffler		3 Header		4 H-Pipe		5 Open	
RPM	TQ	HP	TQ	HP	TQ	HP	TQ	HP	TQ	HP
2750	326	171	329	172	353	185	349	182	352	184
3000	330	188	333	190	354	202	351	201	352	201
3250	331	205	333	206	352	218	352	218	352	218
3500	327	218	331	221	350	233	352	234	351	234
3750	321	229	325	232	342	244	343	245	340	243
4000	310	236	319	243	332	253	336	256	331	252
4250	293	237	304	246	316	256	320	259	323	262
4500	280	240	288	246	305	262	308	264	307	263
4750	265	240	274	248	292	264	292	264	290	263

Note: Only pertinent table values are shown.

The engine we tested is pretty stock, yet it still saw a 10-percent horsepower gain from headers and performance mufflers. An increase of 24 hp and 22 lbs-ft of torque might not seem so extreme compared to what's available with nitrous oxide, but it's very good for a relatively inexpensive bolt-on. Also, the power gains would have been more dramatic with a higher-performance engine. More compression, cam timing and carburetion make the exhaust side even more important; stuff more air in the motor and it has a harder time getting out. HR

More information from the article...

### Problems That Are Bound To Pop Up

Hot rodding is a world of compromise. Almost without exception, anything that makes more power must sacrifice something, be it power at a different rpm, reliability, noise or whatever. A good exhaust is no different. While power usually only increases, the hassle factor often does the same. The following are some of the things you should be ready for when bolting on a set of headers and a trick exhaust.

- **Spark Plug Access** - Headers often make it tougher to get to the spark plugs. Expect plug changes to take about twice the usual length of time, if not more. ACCEL has recently introduced a spark plug designed just for headers that is about 1/2 inch shorter than other plugs, to more easily clear the tubes.

- **Fit** - Even the most expensive headers sometimes need masaging with a hammer to fit around steering boxes or scatter-shields.

- **Noise** - Tube headers are thinner than iron manifolds, so they're going to be noisier and hotter.

- **Leaks** - Headers are notorious for leaking, at both the head flange and the collector. A tip is to use Permatex Ultra Copper silicone on both surfaces, and Loctite on the bolts. Stage 8 fasteners also ensure a good seal, and will fit all but the biggest tube headers. The more expensive headers usually have thicker flanges and tubing, which helps sealing greatly.

- **Plug Wire Burning** - Headers can also wreak havoc with plug wires. The solutions range from proper routing strategy to using insulated wires or insulating covers.

- **Accessory Brackets** - Because some accessories, particularly the alternator, A/C compressor, and smog pump, have at least one bolt connected to the head, headers will often require adapters to make this stuff fit.

- **Starter Access** - There's a good possibility that once the headers are installed, you won't be able to get the starter on or off, especially on a small block Ch%\*y. Be prepared.

- **Legality** - Most of the major header manufacturers have Executive Order (E.O.) numbers on their headers, but if smog legality is a concern in your area, you'd better make sure.

### Headers

Currently, Mopar Performance and Hedman Heddres make headers for '61-'71 Dodge Trucks. Both companies make headers for small block LA-engine powered trucks while Hedman makes big block headers. For slant-six or wideblock 318 engines, you will have to do some searching or special fabricating.

### Part Numbers

- '61-'71 Truck Small Block 273-360 Hedman Heddres - # 79010

- '61-'71 Truck Small Block 273-360 Mopar Performance Headers - # P4529438

- '64-'70 A-100 Van\Truck Small Block 273-360 Hedman Heddres - #79030

- '61-'71 Truck Big Block 383-440 Hedman Heddres - # 79250\*\*

- `72-'91 Truck Small Block 318-360 Hedman Heddres - # 79080 2WD and # 79170 4WD

- `72-'91 Truck Small Block 318-360 Mopar Performance Headers - #P4529439 2WD and #P4529440 4WD

- `72-'91 Dodge B-series Vans (probably fit`70-'71 as well, but no guarantee here) - #P4529467

NOTE: A number of visitors to this site have noted that the Hedman Heddors #79250 do not fit 4x4 trucks. This part number has a problem with interference at the transmission crossmember. The problem is applicable to '61-mid '68 trucks with the hydraulic clutch setup. The heddors will fit mid '68-later trucks with the linkage actuated clutch or automatic. To make these fit '61-'67 4x4 trucks, they must be modified. Also, Jim Patterson wrote in and suggested the use of Doug Thorley's Tri-Y Headers on mid '68-'71 Trucks, P/N Y-124. Although their true application is listed to fit '74-'76 trucks, the block and bellhousing setup is the same dimensionally so they fit well on the older rigs.

{Most} Hedman Heddors are well fitted to the '61-'71 Trucks. The hardest part to installing the headers is removing the old exhaust since parts are usually rusted onto the vehicle. Once installed, the next step is finding a reputable shop to weld the pipes up to the headers and out the back or side of the truck.

#### POLYSPHERE ENGINE HEADERS

Headers are available from the aftermarket as an assembly.

Dodge Truck Association, Poly Truck Headers Tri-Y Design  
14821 Landerwood Drive  
Eastvale, CA 92880  
moparnorm@hotmail.com  
<http://t137.com/dtapoly.bak/addpoly.php>

TTI Headers for Poly engined Autos  
Tube Tech Inc.

1555 Consumer Circle  
Corona, CA 92880-1726  
<http://www.ttiexhaust.com/Category-ClassicHeaders/318poly/TTI318.htm>  
951 371 4878

Stan's Headers Poly Truck Headers Tri-Y Design PN: 318Y-14  
4715 Auburn Way North  
Auburn, WA 98002  
(206) 854-5310 or (206) 850-1835  
[http://www.stans-headers.com/chrysler\\_headers.htm](http://www.stans-headers.com/chrysler_headers.htm)

Spitfire Headers are no longer made. Harold Johnson of Spitfire Headers in Arkansas at (501) 474-0120.

Two companies make the flanges and sell kits that allow one to fabricate a set. These companies are Stans Headers in Seattle and Headers by Ed in Minneapolis.

Headers by ED  
P.O. Box 7494  
Minneapolis, MN 55407  
(612) 729-2802

#### BLOCK HUGGER HEADERS

Sanderson Street Rod Headers lists in their 1997 Catalog (Chrysler from 318 to Hemi) Small and Big block headers to fit vehicles that do not have a crossmember "directly under the center of the motor or a steering box that is within 3" of the motor."

Sanderson part number DD1 is recommended for 318-360 small block motors. Part number DD2 (383-440) has a tube size of 1 7/8" and a collector size of 3", according to their catalog. These are the "Block Hugger" type headers. Both sizes of these headers are available in plain steel, Jet Hot coated or polished stainless.

Sanderson Street Rod Headers  
517 Railroad Ave.  
South San Francisco, CA 94080  
Phone: (415) 583-6617 Fax: (415) 583-8475

#### Tips for Headers in '61-'71 Dodge Trucks.

Use a starter heat shield. These headers are somewhat close to the starter and solenoid on the driver's side. To avoid premature failure of the solenoid or starter, remove it before installing the headers and wrap it with a thick layer of one-sided aluminum, blanket like insulation. Use aluminum tape to double wrap all areas of the cover and make sure that all edges are covered. Also be sure to cover the solenoid, but trim the shield away from the electrical connections on the solenoid. Finally, use large cable ties to fasten the shield to the starter. Some aftermarket companies make shields for Chrysler engines, but these sheetmetal shields do not cover all areas as well as a homemade shield will.

Use Ultra Copper Silicone Sealant. Hot Rod Magazine recommended this in the above article, and the author has never encountered any leaks with the use of this suggestion. Loctite/Permatex makes the product, and it is available at NAPA auto parts as well as most other parts stores. Use this product to accompany the header gaskets or factory exhaust manifold gaskets, not in place of them. The product holds to extreme temperatures, and cleans up easily when removal is desired.

Plan your entire exhaust system. With careful planning and some research, one can achieve maximum horsepower gains with a high quality sound out of the pipes. Here are some suggestions...

- Small-Block engines do best with 2" to 2.5" pipes behind the headers.
- Big-Block Engines output best with at least 2.5" to 3.5" pipes.
- Glass-packs are generally louder than turbo type mufflers. While glass-packs sometimes give a better sound, at higher engine speeds the sound can be too loud or otherwise unbearable. Choosing high flow mufflers can be a little more expensive, but will provide equivalent if not better horsepower and torque gains when compared with glass-packs.
- Stainless steel pipes are exotic, and darn expensive. If you are making a mega buck hauler or want something that will last, buy stainless. Nonetheless, normal steel pipes driven daily will last an adequate length of time if not neglected.
- Re-check the bolts every once in a while. Due to the extreme temperatures and vibration present in an exhaust system, it is important to keep all fasteners as tight as possible. If neglected, the bolts can loosen and allow the collector and head flanges to warp which will forever ruin the headers.