Jeep 4.0L Myth Busting - True Lies

4.0L Myth Busting
From the November, 2009 issue of Jp
By Christian Hazel, Pete Trasborg

Over the years, Jeep's 4.0L engine underwent a few changes here and there, but nothing drastic. Despite the similarities, many still think of the '91-'95 XJs as the fastest six-cylinder-powered Jeeps in stock trim. For some reason, the '97-'01 XJs just don't feel as fast. Did they change the engine? Did OBD2 kill the 4.0L? Probably not, because if you drive a '91-'95 YJ or a '97-'06 TJ, there's no appreciable difference. The older XJs probably just feel faster because they have less sound deadening material and some other heavy components. At least we think that's the case. And with that, let the myth-spinning begin.

We've heard dozens of fish stories about how to make power with the venerable 4.0L Jeep engine, which parts are better, and which ones are wastes. Well, we've got around a half-million miles under our tires thanks to the trusty 4.0L Jeep inline-six. We've also got well over 100 dyno runs on these engines and have a good idea of what makes power, what improves drivability, and what wastes your money.

Cold Air Intake

Myth: A cold air intake with an open dry or oil-impregnated gauze filter will increase power and mileage.

Our Thoughts: While not all aftermarket filter media are as efficient at trapping dirt as the factory-spec paper plate filters, there's no denying you'll see improved mileage and feel a definite seat-of-the-pants improvement.

Claimed Gains: 10-20hp and 1-3mpg

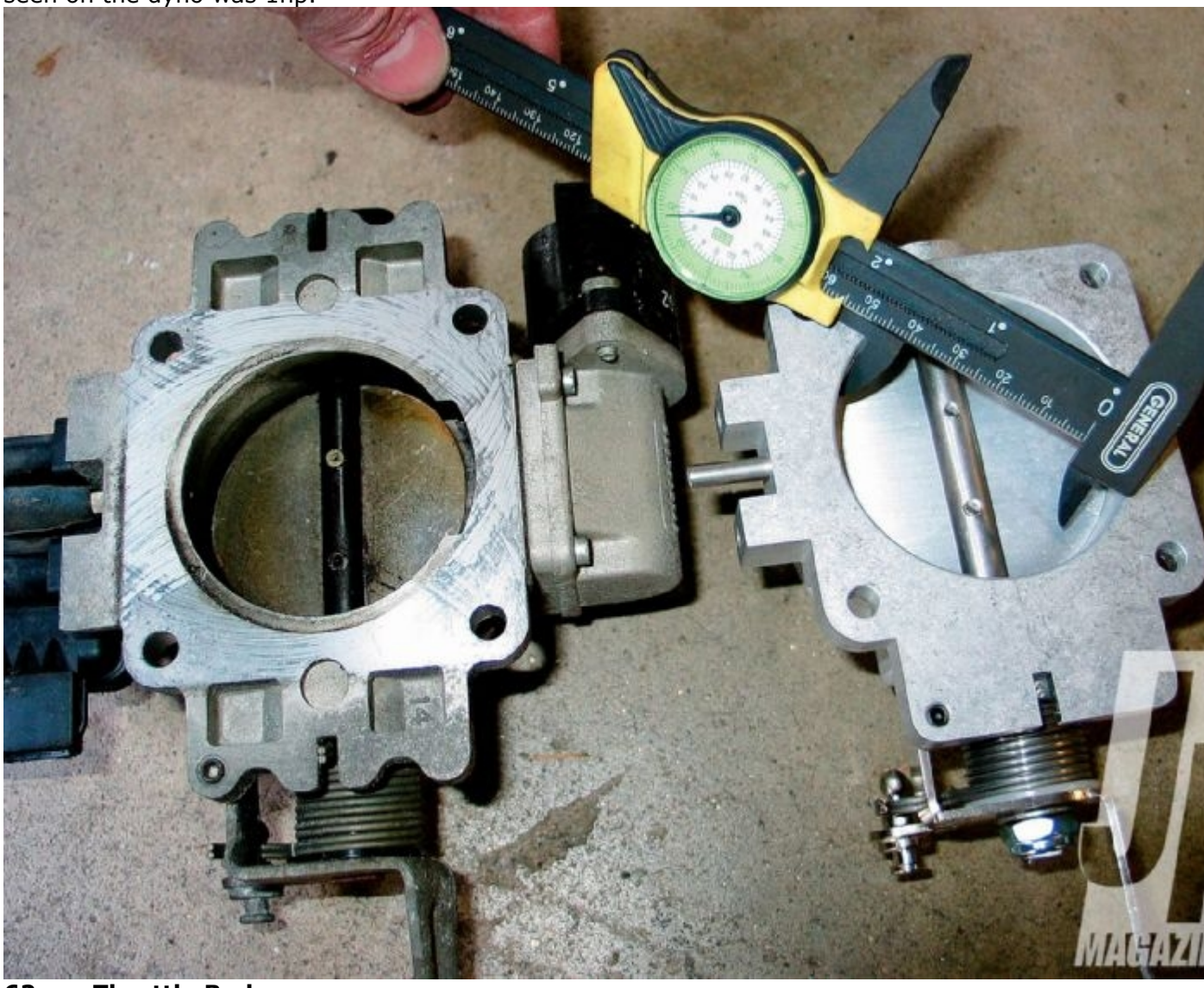
Actual Gains: 5-10hp

Notes: A good cold air intake will wake up any '91-up MPI HO 4.0L with snappier off-idle acceleration, improved top end pulling power, and a definite 1mpg increase. On some models, the major benefit comes from replacing the kinked, convoluted factory ducting.

Reflash Computer
Myth: "I'll just have my factory computer reflashed or a new program installed to deal with my automatic-to-manual transmission swap, stroker engine, supercharger, turbocharger, or whatever."
Our Thoughts: You can't reburn a Mopar computer. At least, we haven't found anybody who can do this. You can run aftermarket piggyback programmers like a Unichip or JET chip, or run a unit that will slightly overwrite certain performance parameters of the factory computer, like a Superchips or Hypertech. These can change the fuel maps or alter timing to some degree. However, we've found these have limited results on later '96-up OBDII computers.
Claimed Gains: That it's possible.
Actual Gains: Can't do it.

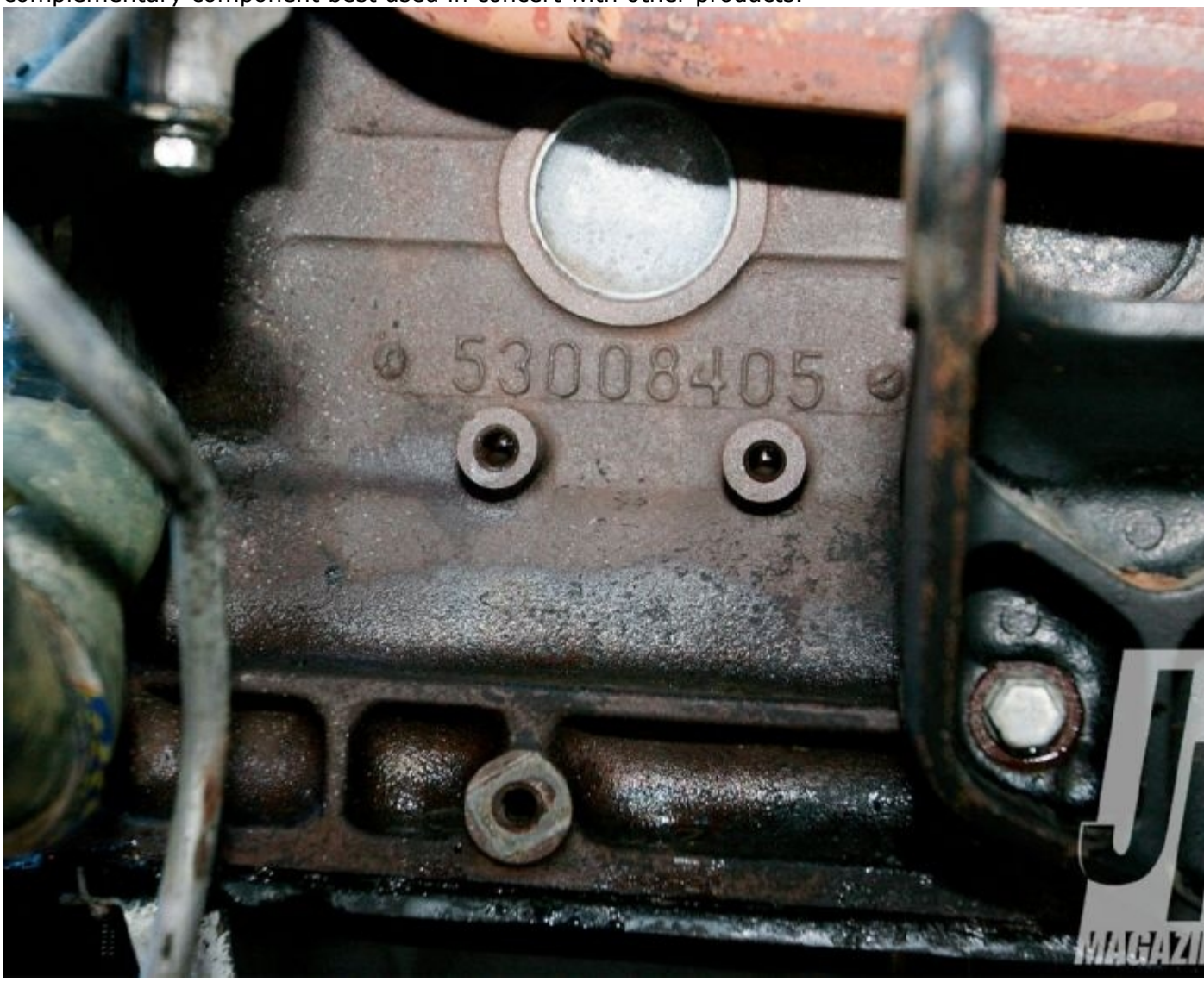
Throttle Body Spacer
Myth: Adding a throttle body spacer will increase the intake plenum volume for more air and a higher velocity intake charge. Also, rifling an aluminum spacer helps air flow into cylinder head with less turbulence for more power.
Our Thoughts: Depending on the application, a spacer works wonders on a carbureted or a TBI-injected engine in which the air/fuel mixture atomizes and flows

through a wet manifold, but results are less drastic on a MPI engine in which only air flows through the intake.
Claimed Gains: 10-15hp
Actual Gains: 0-3hp
Notes: With our Red and Mileage Master projects, the largest power increase we've seen on the dyno was 1hp.



62mm Throttle Body
Myth: The factory 60mm throttle body is a choking point in the stock engine. Boring the factory throttle body or installing a larger-bore aftermarket throttle body will allow the engine to breathe and make more power.
Our Thoughts: On most stock or slightly modified engines the factory 60mm throttle body isn't the cork, and is capable of supplying the engine with enough air to get the job done. Only on a vehicle with airflow modifications like a cold air intake and free-flow exhaust will you notice a difference.
Claimed Gains: 10-20hp
Actual Gains: 5hp
Notes: We did see a 5hp difference with a 62mm throttle body on a 4.0L with a cold air intake and exhaust modifications and believe the increase would be larger with

other airflow enhancements, like a larger camshaft or high-flow cylinder head. It's a complementary component best used in concert with other products.



Head Games

Myth: The '91-'95 7120 casting number are hands-down the best power producers, followed by the '96-'98 0630 and then the '99-up 0331s. The early heads have far superior flow numbers and resist cracking better than the later heads and will make way more power.

Our Thoughts: We don't argue the flow numbers of the '91-'95s are the best, but the later-model HO head flow numbers are generally within 10cfm at the crucial mid-lift areas. Given the conservative factory camshafts, that 10cfm isn't going to do much. All 4.0L heads feature only moderate flow numbers for performance, but offer high-velocity, which is good for low-mid rpm torque. And any '91-up HO head will absolutely kill any '87-'90 non-HO head.

Claimed Gains: 30hp

Actual Gains: 5-10hp

Notes: With the relatively small duration, low-lift factory camshafts there's not much need for cylinder heads with huge flow numbers. The factory heads are well matched

to the factory components. It's only when increasing camshaft duration and lift profiles that aftermarket aluminum or ported 7120 heads show their true advantage.


VICIOUS VOLTS!
MINI
VIP
Performance Distributors

Ignition Hop-Ups

Myth: A hotter spark will allow you to run a bigger plug gap and burn more fuel more completely.

Our Thoughts: It's sound theory, but impractical in practice for most of the 4.0L engines running around out there. Not only is the 4.0L calibrated lean from the factory to aid in mileage and emissions, but most HO engines come with a pretty good ignition that will allow 0.045-inch plug gap with no trouble. It's only when forced induction or larger injectors and different camshaft profiles come into play that hotter aftermarket spark components prove their worth.

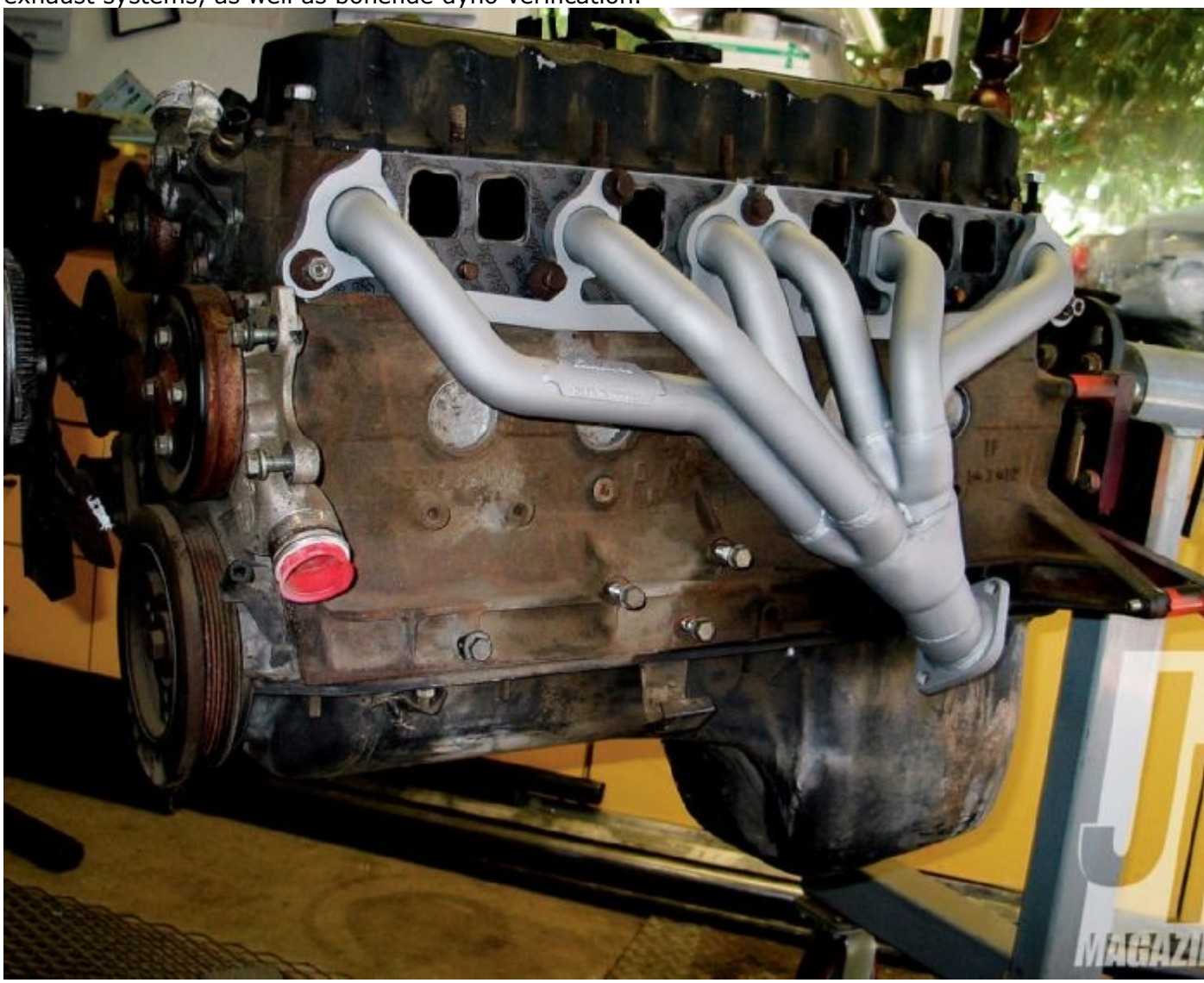
Claimed Gains: 15hp, 20 percent better mileage

Actual Gains: 0-3hp

Notes: You may see some big numbers from 4.0L ignition modifications, but it'll only happen if there was something wrong with the existing ignition system, in which cases even fresh factory replacement parts may garner the same results.


MAGNAFLOW

After-Cat Exhaust
Myth: Removing the restrictive muffler and exhaust pipe behind the catalytic converter will greatly increase drivability, performance, and mileage.
Our Thoughts: Car manufacturers often design exhaust systems to cancel out resonance and unwanted noise at some sacrifice to mileage and power. They almost always leave a little power and efficiency on the table as a result.
Claimed Gains: Up to 25hp and a 10-15-percent bump in mileage
Actual Gains: 5-15hp and 10-percent fuel mileage
Notes: We've realized very noticeable seat-of-the-pants improvements with after-cat exhaust systems, as well as bonefide dyno verification.



Header/Manifold Crack Issues
Myth: All 4.0Ls will crack the factory tubular exhaust manifold at the collector. The extra air getting to the O2 sensor will make the Jeep run rich, foul cat, and run like crap. The fix is to add an aftermarket header for more power, durability, and longevity.
Our Thoughts: We agree with the above. The exhaust system of a 4.0L Jeep has to deal with very high temperatures due to the 4.0L's lean air/fuel calibration that, when coupled with a long and inflexible intermediate tube that leverages the tubular

header, is a perfect recipe for cracking. In fact, even some aftermarket steel and stainless steel headers may not prove immune.
Claimed Gains: 5-10hp and long-life
Actual Gains: 5-10hp and long-life
Notes: Despite its fairly efficient design, you will notice a seat-of-the-pants improvement with an aftermarket header when used in conjunction with an after-cat exhaust and a cold air intake. Just buy the header with the thickest gauge tubing you can.

Forced Induction Fueling and Mileage
Myth: Adding a supercharger or turbocharger will actually improve your mileage because the engine will be making more power and will require less throttle input to maintain the same speed.
Our Thoughs: Anytime you add a supercharger or turbocharger you'll need to up the factory 19lb-hr injector size up to 21-24 lb-hr injectors. Even though you're using less throttle per given road speed, the forced induction is still putting more than one atmosphere's worth of air/fuel mixture down the intake. The level of boost increases the brake-specific fuel consumption. Regardless of the techno-babble, we've always seen a drop in mileage with a 4.0L forced induction system in everyday mixed

driving.
Claimed Gains: 0-3mpg
Actual Gains: -2 to -5mpg

'99-Up Horseshoe Intake
Myth: According to that great wealth of information that is never wrong, the Internet says you'll get a 5-30hp gain thanks to the '99-up 4.0L's swooped, equal length runners and larger plenum volume.
Our Thoughts: While a free-flow intake manifold can deliver more power, it's only going to allow as much air to flow as the cylinder head and camshaft will call for. Upping the intake runner volume too much will cause the intake charge to lose velocity, killing low- and mid-speed power and torque. On a '98-earlier engine running a stock camshaft and unported cylinder head, it's wasted effort.
Claimed Gains: 5-30hp
Actual Gains: 5hp loss on Trasborg's '98 XJ (Project Mileage Master)

Read more:

http://www.jpmagazine.com/techarticles/engine/154_0911_jeep_4_liter_engine_myth_busting_true_lies/index.html#ixzz1V9r81RhO