

Lone Star Lunacy: **Drag-Testing Texas' Sickest Z06s**

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Vette

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VOLUME 31 NO. 9

INSIDE THE HPE TOYBOX

Horsepower Engineering's pumped-up playthings
appeal to your inner hooligan

BY RANDALL D. ALLEN
PHOTOGRAPHY BY THE AUTHOR



With 505 hp and 470 lb-ft of torque in stock form, the hand-built, all-aluminum LS7 engine is the ultimate factory-issue Gen IV powerplant and thanks to its forged-steel crankshaft, titanium connecting rods, and 6-bolt main caps, this 7.0-liter small-block can support even greater levels of axle-mangling output.

To meet the growing demand for such tweaks, tuners such as Houston's Horsepower Engineering (HPE) are working overtime to develop packages capable of extracting every last iota of power from the mill. HPE was founded in 2003 by owner Chuck Anders, and the 13,000-square-foot facility has been pumping out some of the industry's wildest GM-powered hot rods ever since. In fact, the shop currently lays claim to the fastest LT1 F-body and fastest

stock-block LS1 in the country.

According to Anders, "The LS7 is a fantastic engine with excellent street manners, but substantial power gains can be made by optimizing the tuning, camshaft, and exhaust system. Our Stinger package offerings for the Z06 Corvette can add from 30 to well over 200 rear-wheel horsepower to a car and are designed to bring out the true personality of the LS7.

"Our Stinger Tuning package optimizes the stock camshaft and exhaust, while the Stage II and III Stinger Packages use custom cams and system-matched performance parts to significantly increase engine power. Although the Z06 features tubular exhaust manifolds and a 3-inch exhaust system, the LS7 heads are quite restrictive on the exhaust side. Anything

you can do to increase the flow of the exhaust helps power. By utilizing a set of American Racing 1½-inch headers and a 3-inch mid-pipe with high-flow cats, [we can] increase exhaust duration. Throw in a ported HPE throttle body and a Callaway Honker air intake, and the engine wakes up very nicely."

Follow along as we detail three of HPE's Z06-upgrade kits: the Tuner package, the Stinger Stage II, and the Stinger Stage III with nitrous. Next, we'll strap these beastly Vettes to HPE's Dynojet 248 chassis dyno, followed by a quarter-mile test session at Lonestar Motorsports Park, in Sealy, Texas.

How much horsepower can these Zs channel to the rear wheels, and is there any hope for the stock Goodyear F1 SuperCar EMT tires? Let's find out.

Stinger Tuning Package

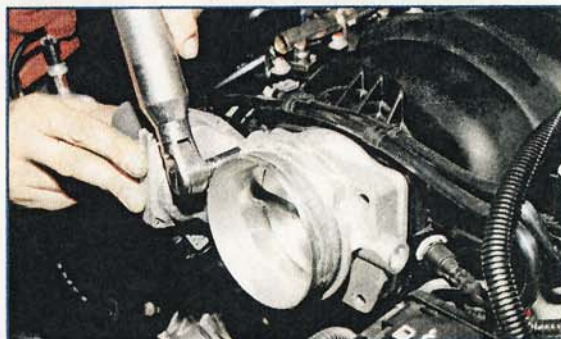
The Stinger Tuning package retails for \$733 and consists of the following:

- Custom dyno tuning
- Motorad 160-degree thermostat
- Custom throttle-body-porting service
- Labor, thermostat replacement

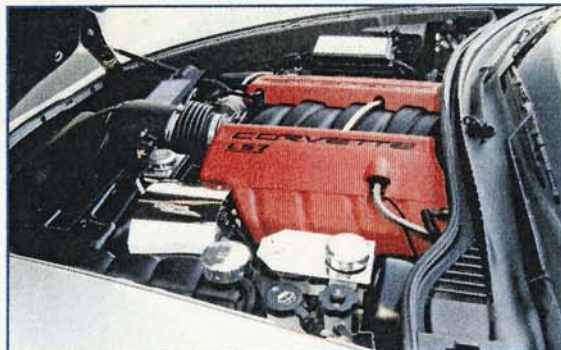
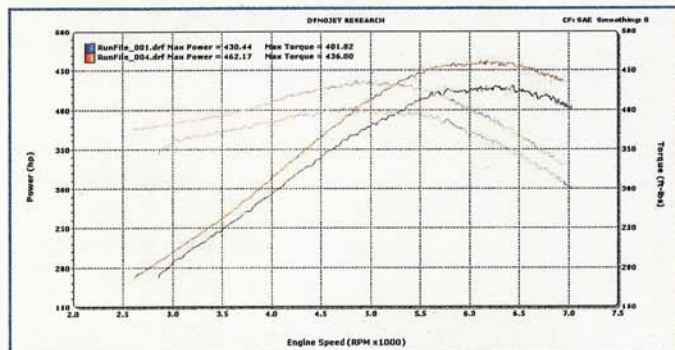
At the heart of the package is a custom dyno tune created on LS7 Edit. (HPE utilizes both a Dynojet Model 248 and a Mustang MD-1750 dynamometer for tuning purposes.) The factory LS7 ECU is set to run at a rather rich 11.7:1 air/fuel ratio at wide-open throttle. By adjusting the timing and power-enrichment (PE) tables, along with a host of other variables, HPE retunes the WOT air/fuel ratio to between 12.5:1 and 13:1.

Cooling is also important. HPE installs a 160-degree Motorad thermostat and ramps up the pulse-width-modulated fans to 100 percent capacity at a lower coolant temperature (188.6 degrees F). The resulting reduction in engine temps allows an increase in ignition timing (27-30 degrees versus the factory-specified 23-26), while also reducing detonation.

Finally, HPE custom ports the factory 90mm throttle body to remove its machined-in leading edge. According to Anders, throttle-body porting alone can uncork 7-10 rear-wheel hp on most LS-series engines.



Dyno Test: Stinger Tuning Package



Configuration	Peak HP/RPM	Peak TQ/RPM	+ HP/TQ
Stock	430/6,300	401/4,800	N/A
Stinger Tuning Package	462/6,200	434/4,800	32/33

Owner: Dale Vickers

Car: '07 Z06

Color: Machine Silver Metallic

Current Mileage: 3,100

Modifications: HPE Tuner Package, HRE 543-R wheels (18x9.5 front, 19x12 rear)



Drag Test: Stinger Tuning Package

Configuration	60-Foot	ET	MPH
Stock	N/A	N/A	N/A
Stinger Tuning Package	2.05	11.97	121.52

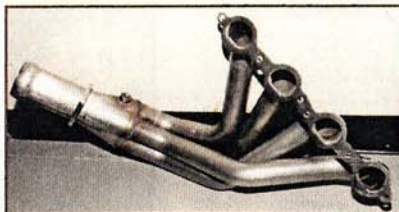
Stage II Stinger Package

The HPE Stage II Stinger package retails for \$5,495 and consists of the following:

- American Racing 1½-inch stainless steel headers
- American Racing X-Pipe with 3-inch metal-matrix catalytic converters
- HPE C6ZS2 Cam Package
- Callaway "Honker" Cold Air Kit
- Motorad 160-degree thermostat
- Custom throttle-body-porting service
- Custom dyno tuning
- Labor, system installation

Both the Stinger Stage II and Stage III packages are designed to increase airflow through the ravenous LS7 motor. (The only difference between the two is the choice of camshaft.) The stock LS7 heads are excellent performers, but simply applying an off-the-shelf LS cam can create poor performance due to these heads' unique intake and exhaust characteristics.

HPE's C6ZS2 cam package is for the enthusiast



who wants a mild lobe at idle and excellent drivability. The cam itself is a Comp custom grind that features 230/242 duration (at 0.050), a

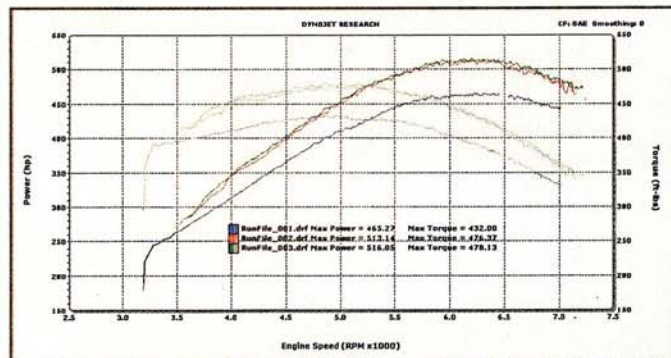
114 LSA, and 0.607/0.620 lift when used with 1.8 rockers. Included in the cam package are Comp 921 dual valve springs, retainers, Super 7 locks, locators, seals, and a new crankshaft-balancer bolt.

HPE relies on American Racing Headers to supply the package's exhaust components. The included ARH long-tube headers feature 1½-inch primaries, 3-inch collectors, and extra-long, tuned-length pipes. ARH also supplies the 3-inch mid-pipe, which uses an aluminized center section, a built-in X-crossover, and two high-flow, metal-matrix cats. (An off-road version with O₂ sensor extensions is also available.) Additional airflow is provided by a Callaway Honker cold-air kit and the aforementioned HPE throttle-body porting.

According to Anders, gains of 50-70 rear-wheel hp are common with the Stage II package. It should be noted that the test results shown here were obtained using one of HPE's early prototype cars. Subsequent changes to the camshaft and exhaust components have reportedly resulted in even greater power increases.

Dyno Test: Stage II Stinger Package

Configuration	Peak HP/RPM	Peak TQ/RPM	+ HP/TQ
Stock	465/6,400	432/4,900	N/A
Stage II Package	516/6,200	478/4,900	51/46



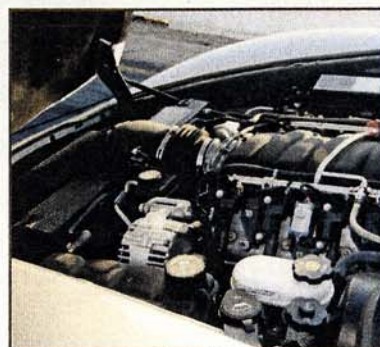
Owner: Sanjay Mehta
Car: '06 Z06
Color: Machine Silver Metallic
Current Mileage: 5,000



Drag Test: Stage II Stinger Package

Configuration	60-Foot	ET	MPH
Stock	2.10	11.80	123.5
Stage II Package	2.15	11.70	129.5

The Z06's tires were not warmed prior to its first pass, resulting in a mediocre 60-foot time. For the car's second run, owner Sanjay Mehta performed a proper, pre-run burnout, at which point the Z spat out its right-axle CV-coupler housing, effectively ending the day. A better representation of the car's performance came earlier in the year, when Mehta posted an 11.30 at 130 mph in similar conditions at Houston Raceway Park in Baytown, Texas.



Stage III Stinger Package

The components of the Stage III Stinger package are identical to the Stage II's with the exception of one critical detail: the camshaft. While the Stage II cam's specifications are public knowledge, the Stage III's specs are shrouded in secrecy. Think duration in the 240s, with lift cresting 0.630 on a fairly wide LSA. When combined with the rest of the Stinger-package components, gains of 90-100 rwhp are possible.

Need more? If your goal is to generate almost 650 rwhp, HPE offers its \$650 LS7 Nitrous Package. It features an NOS wet-plate kit designed to be used with the LS7's 90mm throttle body. The kit is jetted at 100 hp and, with the proper tuning, can be configured to safely turn the LS7 into a truly frightening beast.

HPE allows customers to customize the package with a wide assortment of convenience and safety accessories. Our subject Z06, owned by Vince Agriesti, had the following options installed:

- NOS Remote Bottle opener
- NOS Bottle Heater
- NOS Purge Kit
- MSD Electronics Digital RPM Window Switch
- HPE Installation

NOS Remote Bottle opener

Conventional Corvette nitrous systems require the user to pull over, pop the hatch, and exit the car to open and close the nitrous bottle. This option allows one to perform these operations without ever leaving the driver's seat. The billet aluminum opener features a servo-powered motor and fits all standard-size nitrous bottles. Integral to the design is a quick-release mechanism that allows the valve to be removed for bottle filling. Plug-and-play connectors and a switch are included.

NOS Purge Kit

To ensure consistency and maximum power, any nitrous vapor in the lines should be removed before the system is engaged. Otherwise, the liquid N₂O may not be available

to the nitrous solenoid immediately after engagement. The NOS purge kit comes with an electric solenoid, a 4AN adapter fitting, a 1/8-inch hex nipple, and fittings for the inlet and outlet.

NOS Bottle Heater

NOS recommends running a bottle pressure of 950 psi. This ensures that the gaseous content of the nitrous is fully converted into a liquid. In general, a temperature of 85 degrees Fahrenheit will provide the proper pressure. Bottle pressures below this range don't provide enough nitrous, causing the car to run rich, while excessive pressures can cause a lean condition.

NOS offers a 12-volt bottle heater that

range in which the nitrous system operates. When used with HPE's Stinger Packages, the switch is programmed to activate the system at 3,500 rpm and deactivate it at 6,800-7,500 rpm, depending on cam choice. The switch is wired directly into the Z06's ECU, from which it takes its rpm readings. It works in conjunction with the standard NOS WOT window switch, which is mounted under the gas pedal.

Nitrous System Installation

HPE's installation retails for \$500 and is highly recommended. In addition to the challenges of mounting the solenoids and bottle brackets, a good knowledge of automotive



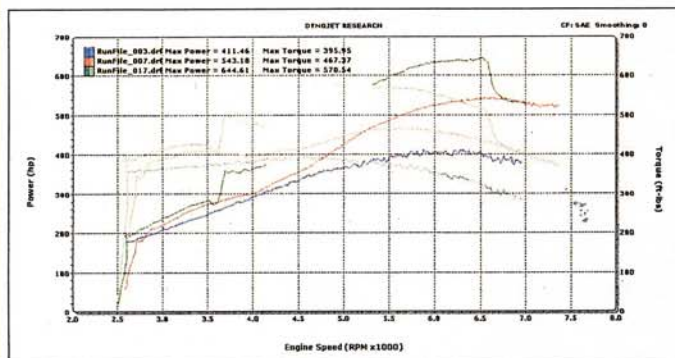
wraps around any standard-size bottle using Velcro straps. Add a bottle-heater pressure switch, and the user can open the nitrous valve, turn on the heater, and allow the adjustable switch to regulate pressure.

MSD Digital RPM Window Switch

This switch is used to determine the rpm

electrical systems is required to ensure that the system operates properly and safely. Installation of accessories, such as the remote bottle opener, bottle heater, rpm window switch, and purge kit, runs \$100 per item. (Because the package and accessories were installed together on our test car, the total labor cost was only \$800.)

Dyno Test: Stage III Stinger Package and LS7 Nitrous Package



Configuration	Peak HP/RPM	Peak TQ/RPM	+ HP/TQ
Stock	411/6,400	396/4,900	N/A
Stage III Package	543/6,500	467/4,900	132/71
Stage III Pkg. and Nitrous	645/6,500	571/5,200	234/175

Because the LS7 ECU can't hold two separate tunes, the tuning on this Z06 was optimized for use with the nitrous system. Instead of aiming for a 12.5:1-13:1 air/fuel ratio, HPE tuned for a slightly richer 12:1. In addition, timing was slightly reduced. As a result of these changes, this car's naturally aspirated output is between 5 and 10 hp less than it would have been with the more aggressive, non-nitrous tune.

Owner: Vince Agriesti
 Car: '06 Z06
 Color: Black
 Current Mileage: 4,200
 Modifications: HPE Stinger Package and Nitrous



Drag Test: Stage III Stinger Package and LS7 Nitrous Package

Configuration	60-Foot	ET	MPH
Stock	N/A	N/A	N/A
Stage III Package*	2.15	11.57	129.83

*Naturally aspirated run. The stock clutch stuck to the floor on the first pass, resulting in inconsistent clutch action for the rest of our test session. As a result, no nitrous passes were attempted.



SOURCES

Horsepower Engineering

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Lonestar Motorsports Park

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 (979) 877-0922
www.LonestarMotorsportspark.com

Conclusion

The Tuning Package netted an impressive increase of 31 rwhp, while the Stage III Stinger and Nitrous Package combo peaked at a mind-boggling 232 rwhp. Even discounting the use of nitrous, the Stage II and Stage III Stinger kits put out 516 and 543 hp, respectively, easily breaking the 600-crankshaft-hp mark.

Chuck Anders noted, "A typical Z06 puts down around 435 to 445 rear-wheel horsepower in stock configuration on our Dynojet chassis dyno. Of the three cars tested here, each was a bit unusual in its baseline dyno pulls. Vince Agriesti's Z06 put down 411 rear-wheel horsepower, while Sanjay Mehta's put out 465. These are the lowest and highest numbers we have encountered with stock Z06s."

As with anything in life, the best-laid plans are often scuttled by forces beyond one's control. The people at Lonestar Motorsports Park went out of their way to make sure the track was in top-notch condition for our testing. Throw in clear skies and temperatures in the 50s, and we should have seen some ultra-quick e.t.'s. So what happened?

First, the factory Goodyear Supercar EMT tires were quickly overpowered at higher-than-stock hp levels. And when the Goodyears weren't scrambling to find purchase, they managed to stick well enough to obliterate Sanjay Mehta's CV coupler housing and put the hurt on Vince Agriesti's stock clutch.

More telling than the 60-foot and quarter-mile times were the trap speeds. Speeds of 130 mph without nitrous tell the real tale of what power lies in these modified Z06s. Had the clutch on Vince Agriesti's car not been so reluctant to put the power down, nitrous-assisted trap speeds would easily have topped the 135 mph mark. Now that's what we call a dangerous toy.