

TWICE AS NICE

REDLINE MOTORSPORTS CRANKS OUT 701 RWHP WITH A VORTECH BLOWER AND BOLT-ON PARTS

BY MICHAEL GALIMI PHOTOS COURTESY OF REDLINE MOTORSPORTS

The centrifugal supercharger market exploded in the 1990s as the Fox-body Mustang enjoyed a rush in popularity. One of the original go-fast supercharger kits for the beloved 5.0 High Output was one from Vortech. Typically, a moderately modified Mustang with bolt-on parts and a Vortech kit would produce roughly 350 rwhp. Today, a similarly prepared factory Mustang cranks out twice the power as Redline Motorsports displayed during a rather basic, and common, supercharger/tuning upgrade.

Last month we followed Redline Motorsports as they enhanced a 2015 Mustang GT with a set of Hooker long-tube headers and custom tune, using DiabloSport CMR software. In stock trim, the car made 377.17 rwhp and 361.92 rwtq and those numbers increased to 411.77 rwhp and 372.90 rwtq with the addition of the headers and ECU calibration. Redline Motorsports prescribed a set of 1-7/8-inch headers, normally a tad large for a stock engine but recommended for supercharged applications. The end game was always to add boost and we are back this month to do so with the addition of a Vortech blower.

There is one note to report in; a JLT Performance cold air kit was added to Kevin Houser's Mustang after our initial testing last issue, which bumped output to 429.79 rwhp, roughly an 18-rwhp increase. There are three levels



Vortech refers to two of its 2015-2017 Mustang GT kits, as "Complete Systems" and they aren't kidding. All the major hardware parts are included, as well as larger fuel injectors (EV14, 47-lb/hr) and ECU calibration. The system is currently undergoing EPA testing to be 50-state legal.



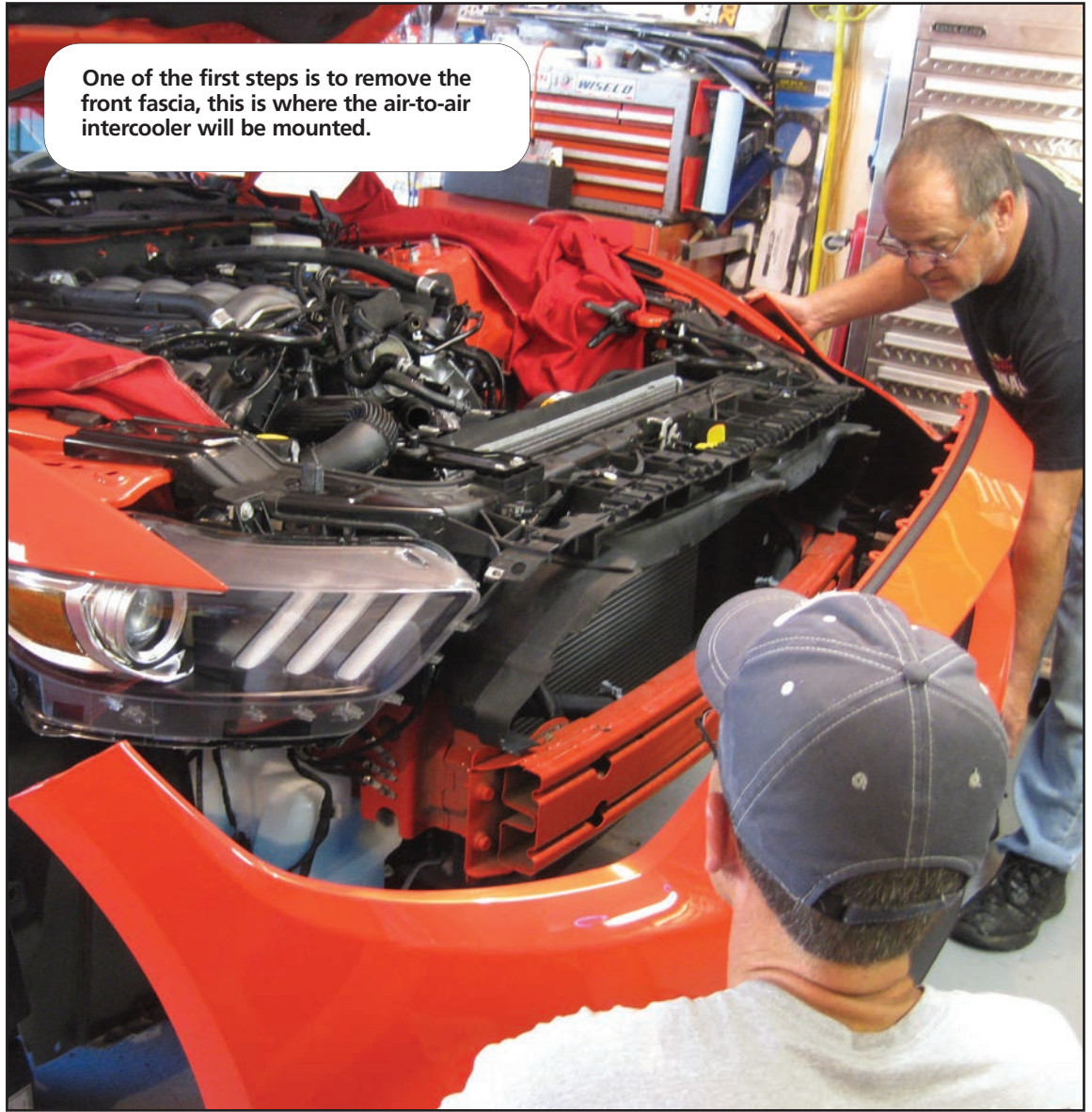
The baseline setup included the Hooker BlackHeart long-tube headers and exhaust system that we chronicled last month, custom DiabloSport CMR calibration, and a JLT cold air intake system. The car made 411.77 rwhp prior to the JLT kit and 429.79 rwhp with it.



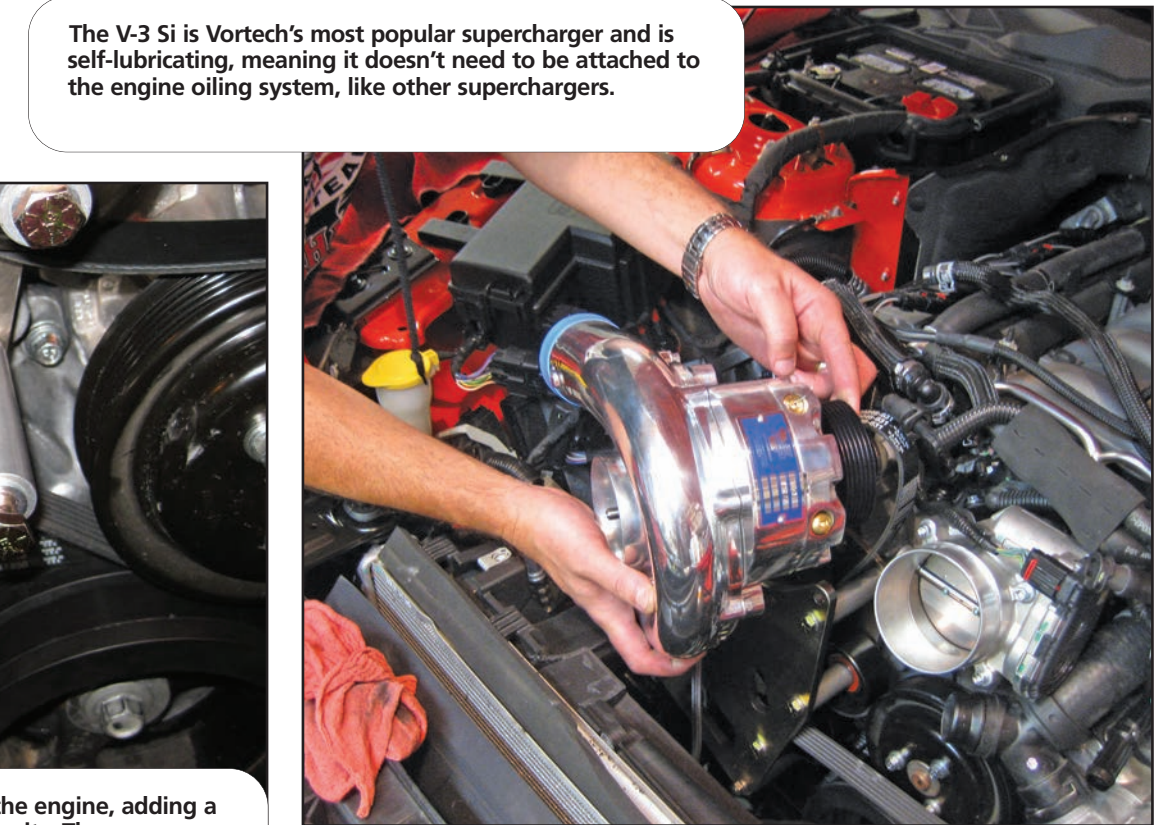
The charge cooler measures 24-inches by 13-inches and is 3.5-inches thick—large enough to support over 1,000 horsepower. It mounts in front of the radiator and behind the crash bumper.



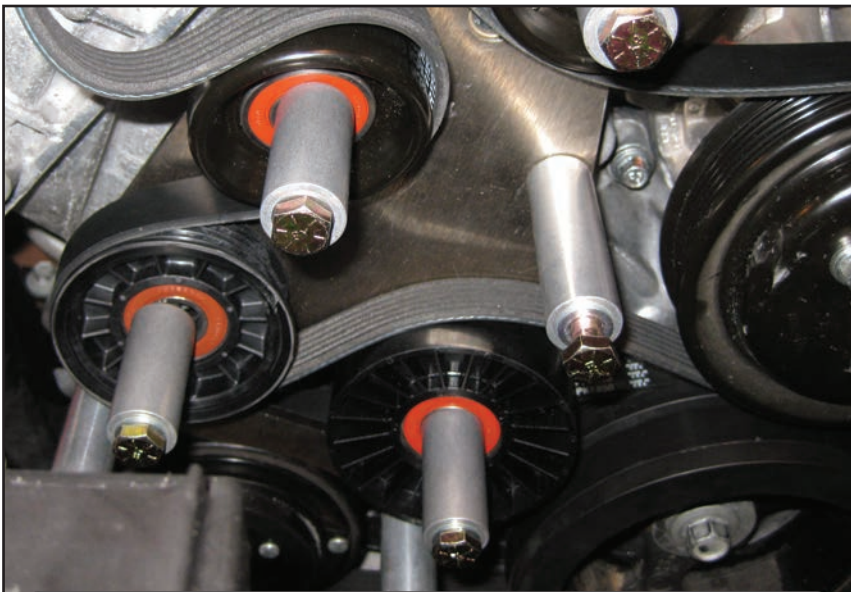
Redline Motorsports swapped the MAF sensor over to the Vortech-supplied housing. The sensor is run as a blow-through combination rather than a draw-through, like some of the company's older supercharger systems on other engine platforms.



One of the first steps is to remove the front fascia, this is where the air-to-air intercooler will be mounted.



The V-3 Si is Vortech's most popular supercharger and is self-lubricating, meaning it doesn't need to be attached to the engine oiling system, like other superchargers.



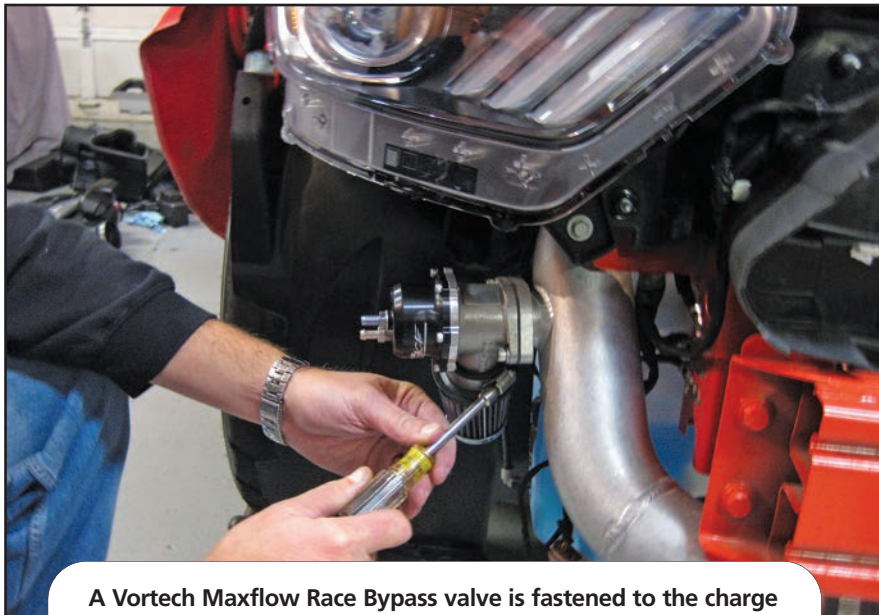
Vortech brackets mount to the passenger side of the engine, adding a few more idler pulleys to compliment the factory units. The supercharger runs inline with the other accessories, which are all six-rib style pulleys. Vortech has an optional eight-rib pulley upgrade.

of Vortech supercharger systems for the 2015-2017 Mustang GT. A base system, that is in process for its 50-state legal tag, and delivers 630hp with 91-octane pump gas, according to Vortech literature. The next step is a sportier 775hp combination that is designed for 93-octane fuel, and a 1,000hp Competition Tuner system for properly prepared Mustangs. Redline Motorsports' Matt Bell chose the base kit, which includes a V-3 Si supercharger, an air-to-air intercooler, and all the bells and whistles needed to bolt it on and hit the dyno.

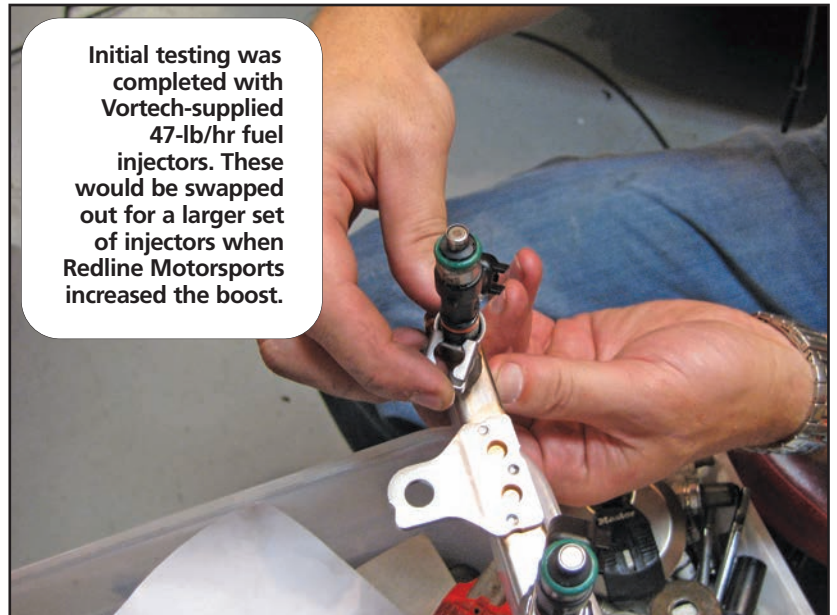
The base system is great but Bell and Houser wanted to go a little further so Redline Motorsports tossed some extra goodies in the shopping cart. The Vortech kit is designed around 91-octane fuel, which is the highest gasoline rating in California. Considering Houser lives in the Missouri-area and 93-octane is the norm, Bell added in a smaller supercharger pulley, larger Injector Dynamics ID1000 fuel injectors, a Vortech Maxflow Fuel Pump Booster, and an Innovators West damper. The plan was to install the system as-is from Vortech, then add in custom tuning, once again using DiabloSport CMR, and then tickle the boost gauge with more manifold pressure.



The S550 Mustang might have a huge hood and massive overall size, but the engine compartment is crowded. The radiator expansion tank is replaced and moved to make room for the Vortech head unit.



A Vortech Maxflow Race Bypass valve is fastened to the charge pipe. The air doesn't need to be re-circulated into the system because the MAF sensor is mounted after the bypass valve.



Initial testing was completed with Vortech-supplied 47-lb/hr fuel injectors. These would be swapped out for a larger set of injectors when Redline Motorsports increased the boost.



The next step in Redline Motorsports' testing procedure was to cut a new custom tune, via DiabloSport CMR software. It was uploaded to the ECU via a DiabloSport Trinity hand-held programmer. The higher peak RPM—7,000—yielded more boost with 10 psi on the gauge and higher output—656.14 rwhp and 531.56 rwtq



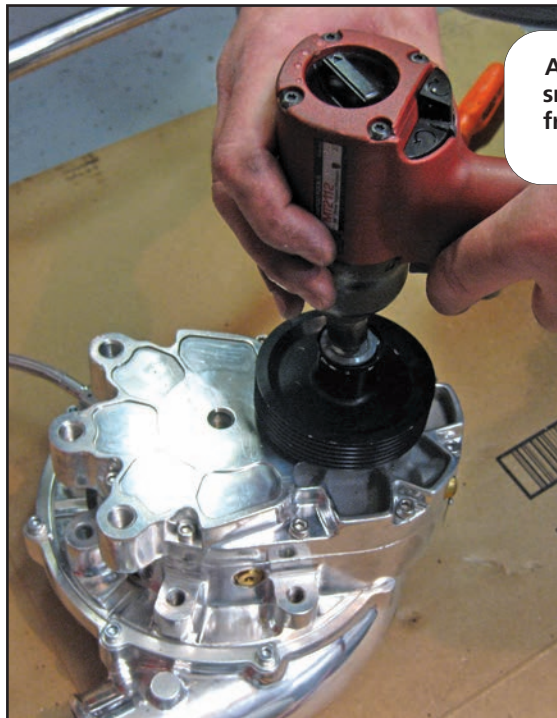
Shown is the out-of-the-box Vortech kit, which produced 9.5 psi of boost and the car laid down 560.74 rwhp and 460.89 rwtq. Kevin Houser's Mustang features a factory MT-82 six-speed transmission.

Adding a supercharger to a Coyote engine is a tried and true modification; after all, the engine platform has been enjoying the boosted life since 2011 and the results are predictable at this point. The S550 Mustang platform, however, did throw the engineers a curveball. Vortech's Lance Keck explained that they didn't want to mess with a good thing, so the company stuck with its V-3 Si as the base supercharger and a V-7 JT head unit for its Competition kit. As Keck said, why mess with a great recipe?

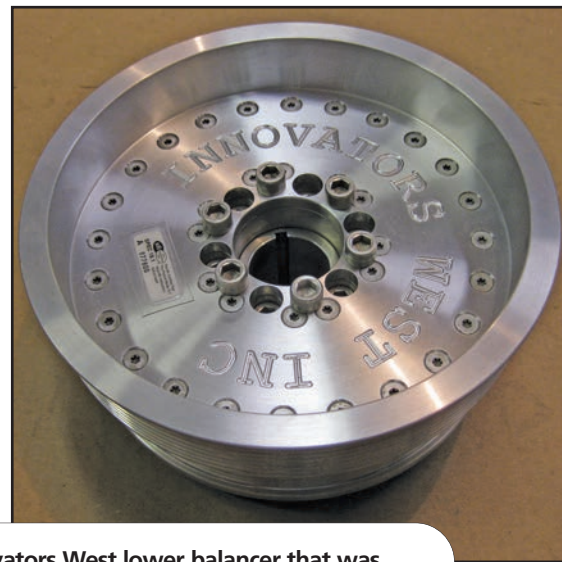
"The largest challenge that we had with the S550 was the layout of the front fascia," Keck explained about the change in chassis/body configuration. He continued, "With the changes that Ford made to control air at the front of the vehicle, it was a challenge to say the least, to get a large enough charge cooler in the vehicle and not have to cut/modify the front of the car." The air-to-air intercooler requirements dictated a unit capable of supporting 900-1,000 hp, requiring great care to accomplish both tasks of fitment without excessive modifications. The brackets to mount the supercharger are a carryover but the charge piping is different with the under hood layout.

Another obstacle for the Vortech team was the new ECU calibration, which seemingly becomes more complicated with each passing generation. Keck shared, "With the addition of Charge Motion Plates, Ford felt the need to increase all of the spark tables from 16 to 28 and this also applies to the torque tables, among others. So the calibration portion became more complex." The end result is a Vortech-supplied tune that has the car running like stock and makes healthy power on 91-octane gasoline.

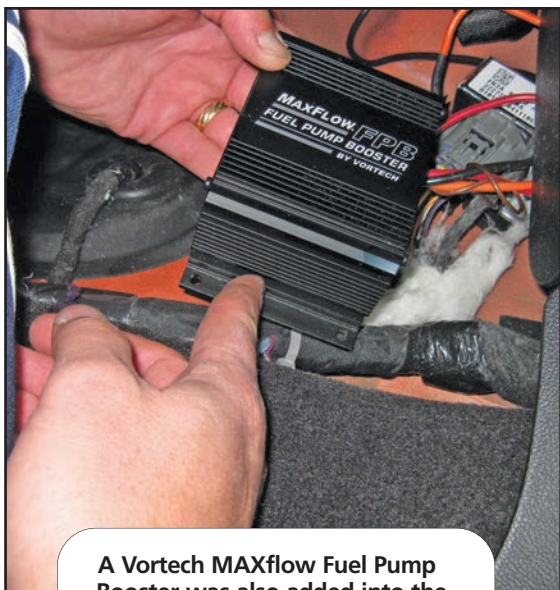
In the out-of-the-box trim, Houser's Mustang had no problem spinning the DynoJet rollers to 560.74 rwhp and 460.89 rwtq. The engine saw 9.5 psi of boost at the 6,800 RPM redline. Next up was some fine-tuning by Danny Biggs, the in-house calibrator at Redline Motorsports. The more aggressive tuning combined with a 7,000-RPM peak engine speed allowed the Mustang to crank out



Adding more boost was the job of a smaller diameter supercharger pulley, going from 3.60-inches down to 3.33-inches.



Also new was an Innovators West lower balancer that was not only SFI-certified but also featured a 7.25-inch diameter to help drive the supercharger a little harder as well.



A Vortech MAXflow Fuel Pump Booster was also added into the combination to help increase the fuel pump capacity.



Anticipating a significant rise in power over the base kit, Redline Motorsports swapped in a set of Injector Dynamics ID1000 fuel injectors, which are rated at 1,015cc/min (roughly 96.6 lbs/hr at 43.5 lbs of fuel pressure) of volume.

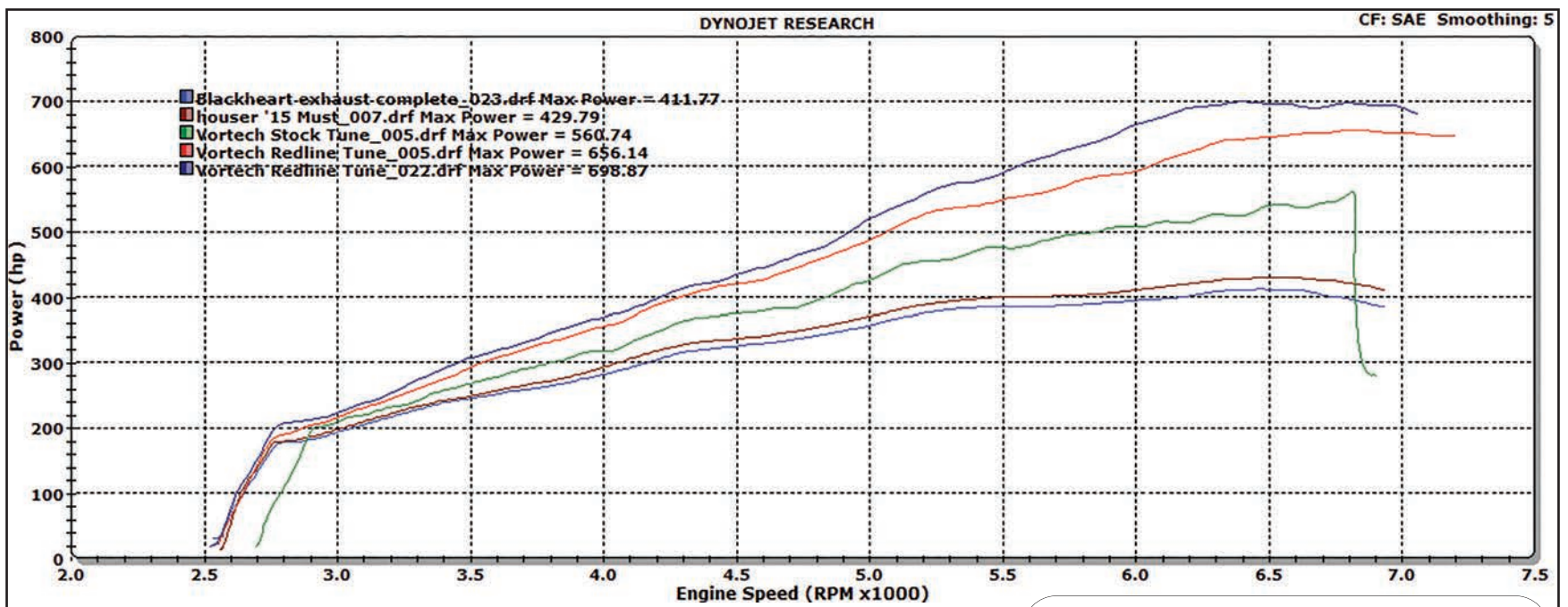
656.14 rwhp and 531.56 rwtq and boost read 10 psi. That was a 96-rwhp gain but Bell and Biggs weren't done yet.

The car was removed from the dyno and cooled off as the team swapped the supercharger pulley to one with a 3.33-inch diameter and the lower crank damper with an Innovators West one that has a 7.25-inch diameter pulley groove. Those changes pushed the boost needle to a peak of 13 psi and the Mustang turned the rollers to 698.87 rwhp and 582.87—on pump gas! After a little more refinement to the calibration, the car was put back on the dyno and it pushed out 701 rwhp with a similar torque reading. All dyno testing was completed on a DynoJet chassis dyno and Houser's Mustang is equipped with a MT-82 manual transmission.

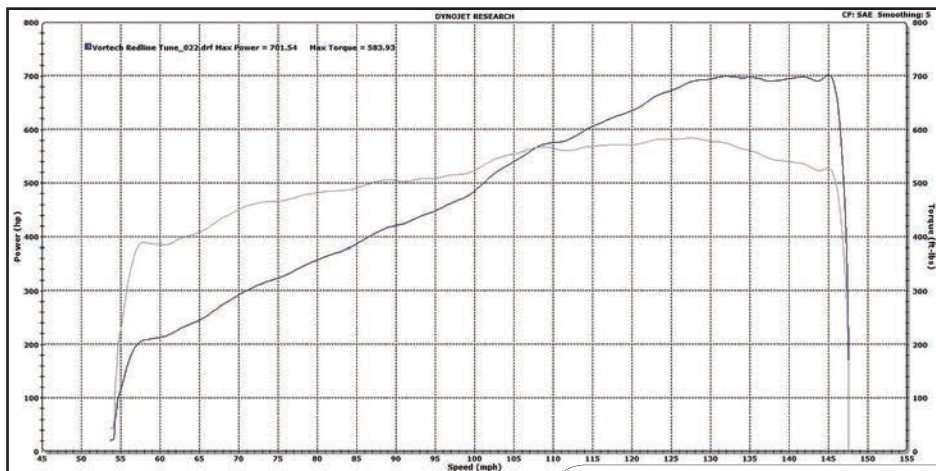
Twenty-five years later, a Vortech enhanced late-model Mustang is producing twice the power with a comparable modifications list. This truly is the golden age of horsepower. ■



And finally the last modification for the final run was the addition of a JLT cold air kit open element air-filter, in place of the factory air box.



Here is a step-by-step of the progress with our test subject, from the stock engine with the exhaust upgrades to the supercharged version.



A touch more tuning and Redline Motorsports achieved the goal of cranking out 701 rwhp from the stock-ish 2015 Mustang GT.

SOURCES

<p>DiabloSport DiabloSport.com 866 404 6141</p>	<p>Redline Motorsports Redline-Motorsports.com 309 863 5929</p>
<p>Innovators West InnovatorsWest.com 785 825 6166</p>	<p>Vortech Superchargers VortechSuperchargers.com 805 247 0226</p>