Chemically Cool Your Colt

Pick up almost 80 hp with Snow Performance’s water/methanol boost cooler.

Supercharging is fast becoming one of the most popular modifications to late-model Mustangs as 50-100 percent increases in horsepower and torque can be had without any other changes.

One of the byproducts of supercharging or compressing air is an increased air charge temperature—and at mild boost levels, this is not much of an issue. For greedy gearheads who like to pump up the manifold pressure, the higher air temperatures can result in pre-ignition and detonation, unless ignition timing (and subsequently power) is reduced. To combat this, some blower companies offer cooling units that use an air-to-air or air-to-water heat exchanger to cool the incoming charge, thus allowing you to use nearly the same amount of timing.
Thanks to the Vortech supercharger, the vacancy left by the stock airbox will now house the methanol/water tank. Since the fuel pressure regulator had already been installed in the region, we needed to mount the pump in a different location. The pump should be mounted below the tank for gravity feed.

The Vortech inlet tube is removed so we can install the spray nozzle.

Use a 7/16-inch drill bit to make a pilot hole in the elbow. Then, a 1/4-18 NPT tap is used to cut through the soft aluminum tube.

The spray nozzle's pattern is designed for optimum coverage of the incoming air charge. This produces better atomization and mixing.

We put a dab of Loctite sealant on the nozzle end and installed it into the intake tube.
With the Boost Cooler tank occupying the only free space in the engine bay, we opted to mount the pump directly below it on the bottom of the frame rail and in the inner fenderwell. Although its operation is rather quiet, the pump uses rubber bushings to isolate any vibration.

Due to the corrosive nature of methanol and superior heat protection, Snow Performance uses high-temperature nylon for its tubing and elbow connections instead of the more common plastic stuff. The elbows use quick-release connections to join the tubing, which simplifies installation as well as deconstruction of the system. Make sure the corrosive methanol/water mix doesn't get on your paint.

Snow Performance includes this one-way check valve which helps prevent boost from the supercharger from blowing back into the system.

The 2-quart methanol/water tank is mounted to the inner fender apron using common sheet screws. It also features a nylon quick connection.
We successfully guided the lines to and from the pump through this factory-supplied hole in the framerail. The nylon tubing is rather durable, but you'll want to make sure there are no severe bends that could hamper flow.

The variable control module, which comes with the Stage 2 kit, was mounted on the firewall near an existing switched 12-volt power source, which was connected to the red wire. The green wire was connected to the LED on/off light.

The variable controller allows you to adjust the release of the methanol injection. One switch sets the start pressure and the other sets the full boost pressure. The injection then increases/decreases linearly between the two settings.

Injecting a small amount of nitrous oxide to cool the intake charge is also an alternative, but nitrous oxide isn't cheap, nor is the high-octane race fuel that many turn to. Snow Performance of Woodland Park, Colorado, offers an alternative that increases power without depleting your pocket book.

Methanol/water injection is a far more inexpensive option that allows you to safely increase ignition timing as well as manifold pressure or boost for improved performance. Its high latent heat of vaporization provides an increase in air density and this in turn results in better detonation control. And where an intercooler will reduce boost, the Boost Cooler will actually increase it.

The Snow Performance Boost Cooler kit
Sivori had been to Danny's Pro Performance in Keyport, New Jersey, and tuned his combination on Sunoco 116-octane race gas. Snow Performance said there would be a significant gain over using race gas, but an even larger one using pump gas. Methanol prices range between $1.50-$3 per gallon, making it far more cost effective than race gas, which often sells for $6 per gallon or more. (Methanol is usually available at your local racetrack or at www.Hiperfuels.com.) The witty crew at Danny's used their rollback tow vehicle to elevate and tilt the coupe to allow them to drain the race gas prior to our post-Boost Cooler dyno tuning.

Our switched 12-volt source was located in the ashtray in a switch panel. The Boost Cooler kit also includes this activation LED light that we mounted in the A-pillar gauge pod.

With everything mounted and all of the lines connected, we turned on the system to check for leaks.

Available in two stages, Stage One is for mild boost applications and includes a lower volume pump and adjustable boost pressure switch. Stage two includes an upgraded pump, as well as a boost dependent, variable control module to adjust the flow of the methanol/water mix. With the controller, a small quantity is injected at lower levels of boost with full injection at higher levels resulting in improved drivability. Retail prices are $299 and $399 respectively, and both kits include everything needed for installation with the exception of tools. You'll probably need to pick up the required 1/4-18 NPT tap and maybe a 7/8-inch drill bit, but basic hand tools and a drill are all that are needed. Installation takes approximately 3-4 hours.

Snow Performance's owner Matt Snow came out to the East Coast to assist in the
Sivori poses with his secret to repetitive boost. A little dab of VHT on the belt made sure there was no belt slippage and subsequently no loss of boost while we were tuning. Without it, we would see dips in the dyno graph about every three or four runs.

Installation of his kit on Andrew Sivori’s 87 notchback. Sivori’s coupe was a prime candidate for the Boost Cooler, as it was running moderately high boost from its Vertech T-Trim supercharger with no intercooler. Although the Mustang is driven to and from the track, it doesn’t see much street use otherwise, so Sivori had tuned the pony on 118-octane race gas. In this configuration, 549 rwhp and 525 rwtq was attained with 4 degrees of boost retard and 15 psi of boost. The power output is pretty stout given the relatively old-school engine combination.

Snow said we would see an increase over the race fuel, but he also explained that using the methanol/water combination with pump gas would result in more power than just race fuel alone. And one of the benefits to using this system is not having to fork

TEST VEHICLE AT A GLANCE
'87 MUSTANG LX 5.0

• Keith Craft 306ci short-block, balanced, stack crank and rods, forged TRW pistons
• "Vintage" TFS Street Heat cylinder heads with 1.94/1.60 valves, ported by B&B Performance of New Jersey
• Ford Racing X303 camshaft, installed straight-up
• Trick Flow Specialties 1.6:1-ratio roller rocker arms
• Ford Racing GT-40 intake manifold with ported lower
• Ford Racing 80mm throttle body
• Texas Turbo 1 3/4-inch long-tube headers, 3-inch exhaust, Or. Gas X-Pipe, Flowmaster two-chamber mufflers
• Pro-M 80mm mass air meter calibrated for fender-mount, supercharged application
• 4268 Ford Racing fuel injectors
• Aeromotive sump and tank, A1000 pump, billet rails, boost referenced FPR
• MSD 6A box, coil, and BTM
• Approximate engine CR ratio: 9:8:1
• 17 psi boost on dyno (max without Boost Cooler was 15 psi)
• Vertech T-Trim supercharger (2.75-inch pulley)
• Anderson Ford Motorsport Power Pipe
Since the Mustang had been tuned using race fuel, we had to make several runs to tune it for pump gas before we would be able to start adjusting the Boost Cooler. While 493 rwhp on 93-octane pump gas is nothing to be ashamed of, the Boost Cooler eclipsed that by 78 hp for a total of 571 rwhp. Torque also increased from 477 to 516 lb-ft.

over the money for expensive race fuel so we drained the tank and drove the car to the corner for some Amoco 93-octane.

We started with the timing retard set at 2 degrees and initial timing at 10 degrees. The Mustang turned the rollers to 493 hp and 477 lb-ft of torque and this would serve as our baseline as we went at 12:1 on our air/fuel ratio.

The kit directions include tuning tips for the controller. Snow set the variable controller to start injection at 3 psi and be in full swing at 5 psi. The methanol/water injection increased boost pressure 2 psi for a total of 17, but the air/fuel ratio took a dive, so we began making adjustments first to the timing retard, then to the fuel pressure and eventually the initial timing to lean it back out. Thanks to the Boost Cooler, we were able to decrease fuel pressure by 7 psi and increase initial timing to 13 degrees to bring back the air/fuel ratio to 12:1. This resulted in 571 hp and 516 lb-ft of torque at the wheels. That’s over 78 hp from $1.50 worth of methanol.

Granted you have to factor in the cost of the Boost Cooler kit, but it’s a far cry from the price of an intercooler and slightly less than a nitrous kit. After nearly a dozen runs on the dyno, we’d barely used an eighth of a tank of methanol and water. Talk about horsepower per dollar. The Boost Cooler also offers great results on diesel and naturally aspirated gasoline applications as well.

**SOURCES**

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