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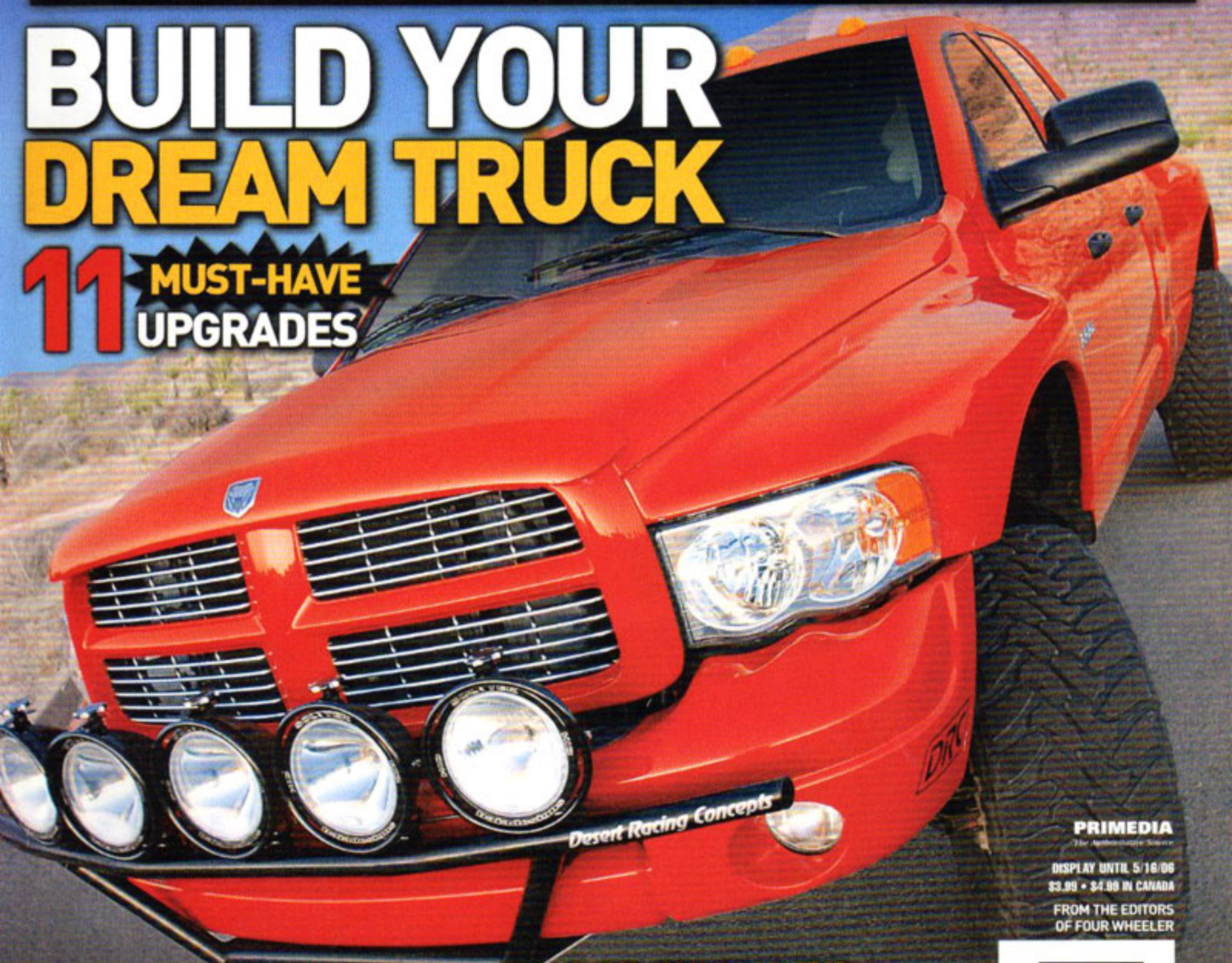


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11 MUST-HAVE UPGRADES



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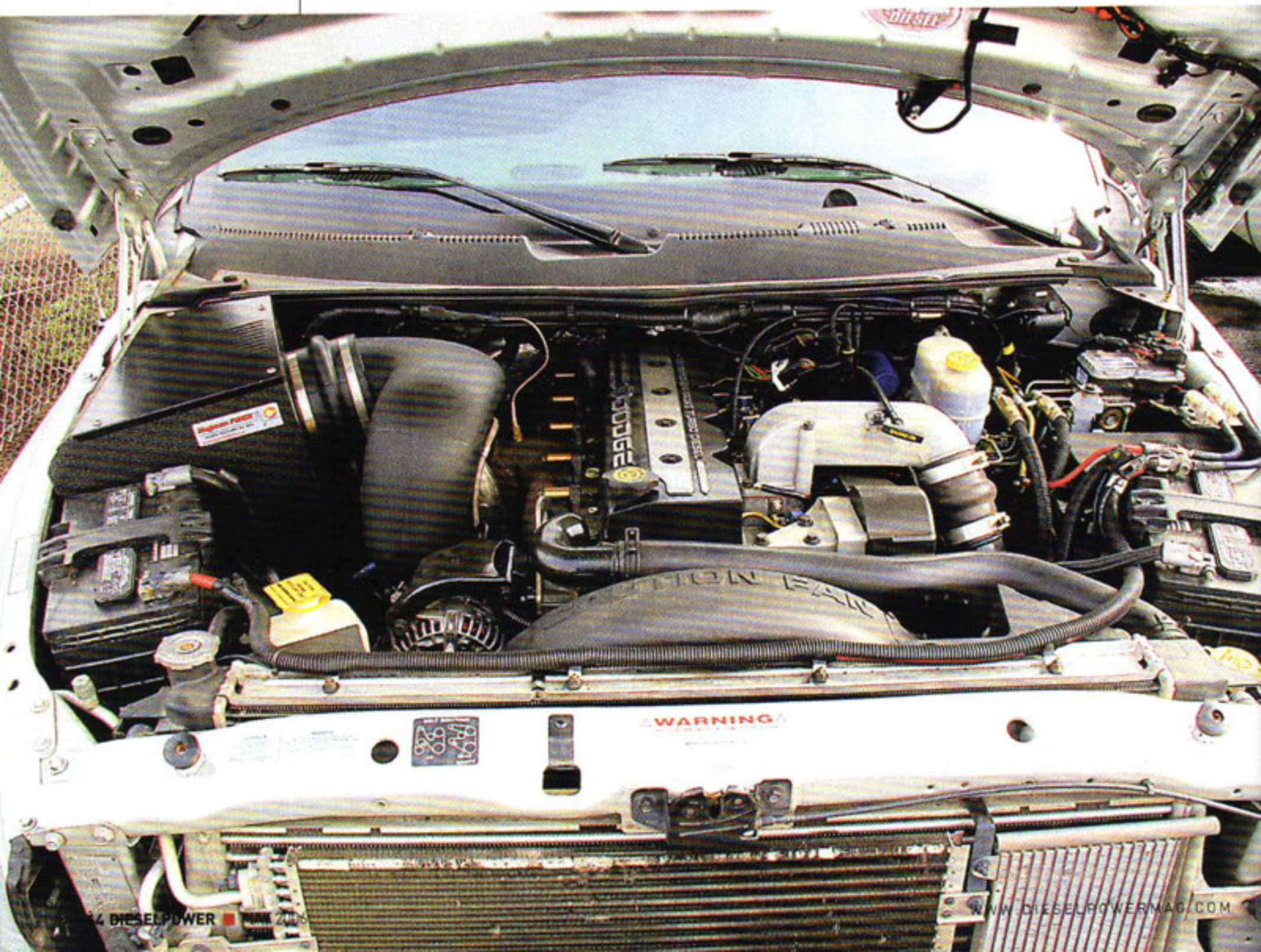
THE FIRST 11 MODIFICATIONS

YOU NEED TO
MAKE TO
YOUR DIESEL

There is a dizzying array of aftermarket products available today for the diesel enthusiast. From the mundane to the exotic, there are products being engineered that can deliver unbelievable performance and add to the power

and efficiency of your vehicle. Sometimes, it's hard to know how to narrow down the options, or even just where to start. So, if you want to know how to spend your first \$50, your first \$100, or even your first \$1,000, you've come to the right

place. Our list won't work for every single diesel owner out there. But, it's what we'd tell you to do if you were, say, our brother's neighbor's boss who just bought a new diesel truck and wanted to make it run stronger. Take a look.



your engine's ability to pump air, it may be time to look into a new set of injectors. With diesel engines, the role of the injectors in overall performance can be huge. The aftermarket offers performance injectors that are typically based on stock units that are reworked to flow more fuel at a given setting. The key here is to match the injector with your usage. Typically, injectors are rated for horsepower levels. The amount of diesel fuel required to support a particular power level can be calculated. And in a perfect world you want injectors that won't be overkill for your application yet aren't maxed out either. Like most things in life, injectors have a sweet spot where they work best.

STEP 8: LIFT PUMPS

Some performance enthusiasts like running an auxiliary electric lift pump as insurance to protect the injection pump, usually at the least opportune time. Some truck owners turn to aftermarket lift pumps out of sheer necessity. Duramax owners should consider an electric lift pump at anything above stock power levels because these trucks don't have lift pumps at all.

At best, the stock lift pump is designed to provide fuel delivery for a stock engine. Once you begin adding the kinds of aftermarket upgrades we've been talking about, the demand for fuel goes up, too. The stock lift pump quickly falls short. Fluctuations in performance at higher rpm and engine load will signal it's time for an upgrade.

STEP 9: INTERCOOLERS

In a turbodiesel engine system, the intercooler is designed to do one thing: Cool the air after it leaves the turbocharger and before it reaches the engine. Sometimes called *charge-air cooling*, this process has tremendous impact on engine performance. As pressurized air passes through the intercooler from the turbocharger, the temperature of the air drops and it becomes more dense. Cooler, denser air allows greater amounts of fuel to be burned, which means greater horsepower. Cooler, denser air also means lower exhaust gas temperature (EGT), which allows the engine to perform even more efficiently.

Basically, an intercooler is a heat exchanger. And as with all heat exchangers, the greater the surface area, the more efficiently it cools. Stock intercoolers are fine for stock applications. But, as you expand the performance attributes of your truck, the stock unit may not keep up. Most aftermarket intercoolers are one-piece, aluminum, fin-type models with inlets and outlets that are much larger than stock to provide greater flow of air. Using ambient air flowing through the grille and radiator, a high-performance intercooler will dramatically lower the temperature of the boost intake air and contribute to optimal engine performance. So whether you are converting to a turbo setup or swapping in a bigger turbo, don't short-change on your intercooler. It's one of the best improvements you'll make.

STEP 10: NITROUS OXIDE INJECTION

Another option for pulling more power from turbodiesels is nitrous oxide injection. When nitrous is injected into the intake air, the heat of compression breaks the molecules down into nitrogen and oxygen. It is this extra



oxygen burst that allows the engine to burn greater amounts of diesel fuel. The more air you can pack into the combustion chamber, the more fuel you can burn, and the more power you can produce. Nitrous is literally like a turbocharger in a bottle. Naturally, though, all systems have their limits, and then fun ends when the bottle runs out.

STEP 11: WATER/METHANOL INJECTION

For heavy-duty tow rigs and street racers, this might well be the final power upgrade. Often referred to as chemical intercooling, water/methanol injection provides big gains in power with cooler combustion temperatures. Running a 50/50 water/methanol mix, it's typical to see gains of 70-plus horsepower, 100-plus lb-ft of torque, and 3 to 5 psi of boost, all with a decrease of 200-plus degrees in exhaust gas temperature.

The science behind this technology has been around for decades, and the mix has long been popular with drag racers. Basically, a high-pressure pump injects the water/methanol mixture into the intake plenum. Small nozzles spray in the juice as the turbo boost level comes up. Usually, an electronic controller meters out the amount of water/methanol so that it remains proportional to boost levels. The burst of speed you get as you drop the hammer is considerable. And it's perfect for lowering EGT when pulling heavy loads up steep inclines or simply enjoying the wow-factor on the quarter-mile. **DP**