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# Decontamination

## Cleaning Power Stroke EGR Valves

TEXT AND PHOTOS BY STEVE TEMPLE

**A** clean diesel engine is a happy engine. Conversely, baked-on carbon and soot deposits make for an unhappy one. Today's high-output diesel engines are extremely sensitive to deposits that build up throughout the entire fuel system. Even small amounts of contaminants can lead to plugged injectors, increased exhaust emissions, reduced fuel mileage, smoke, engine clatter, reduced performance and other drivability issues.

Ford's 6.0L Power Stroke is particularly susceptible to these problems, partly because of the location of the EGR (exhaust gas recycling) valve. Most 6.0 owners have already dealt with this issue since the problem throws the most common error code. Part of the problem is that the EGR valve sits on top of the

motor—a cooler location than on the newer 6.7L Power Stroke, which even has its own EGR cooling system. Consequently, the EGR valve can get plugged up in as little as 20,000 miles.

Conventional wisdom says idling time doesn't hurt a diesel, but not so on a 6.0L. Experts agree it really should be driven hard



to minimize buildup of soot in the EGR passageways and the air intake manifold.

"We don't see the same type of problem on guys who work them," points out Tim Anderson of T&A Performance. In contrast, he notes that slow-speed operation under no load (such as when idling excessively or with occasional-use "grocery getters") actually



**1** BG Products' contaminant removers consist not only of several additives, but also a Diesel Induction Service Set that sends the cleaners through the runners.



**2** Before and after readouts from the engine computer indicated that both the mass fuel and engine load were significantly reduced from "dirty" to "clean" levels.



**3** Carbon deposits were clearly obvious on this sensor. Buildup of this contaminant robs performance and increases emissions, among other problems.

contributes to the problem along with poor fuel quality and simply high mileage.

This buildup markedly restricts airflow that decreases fuel economy and lowers overall power output. It doesn't take a degree in mechanical engineering to understand how accumulated deposits interfere with the proper functioning of an EGR valve, which would result in higher exhaust emissions and lower fuel economy.

Removing carbon deposits can be done by hand, as many Power Stroke owners have found out. And replacement is even more expensive. For a really thorough cleaning, a number of companies offer additives that claim to get rid of carbon crud. One firm in particular, BG Products, offers several different cleaning additives for flushing the intake, injectors, crankcase and fuel system, along with a pressurized mechanical process.

One reason we decided to check out this one in particular is not only the comprehensive approach, but its track record with hard-working municipal truck fleets all across the country, plus others run by the federal government. They all employ BG Products on a regular basis to ensure engine longevity and optimize performance. In addition to cleaning the engine, claimed benefits include restoring fuel economy, reduced emissions and improved cold-starts.



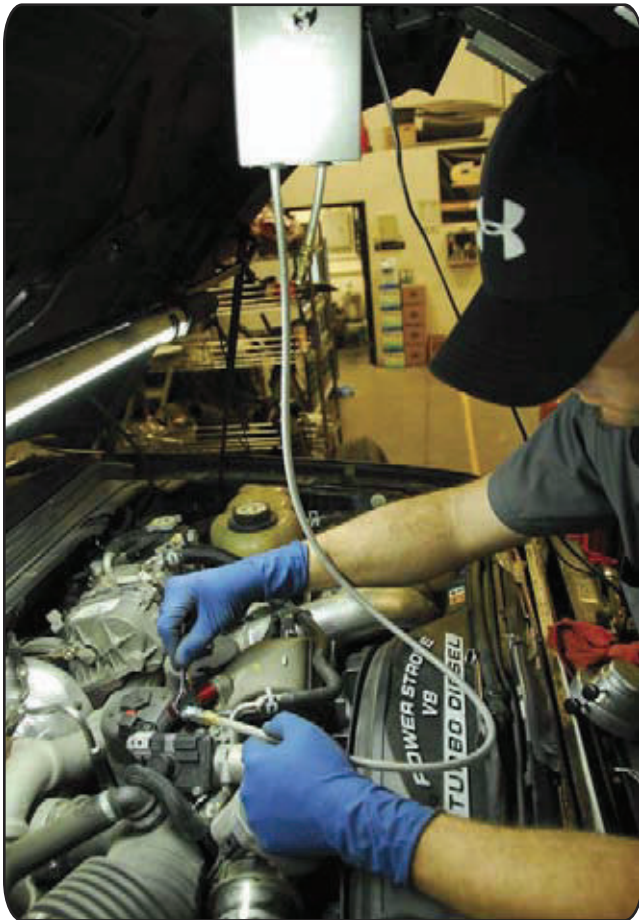
**4** After disconnecting the intake hose, additional carbon was also evident.



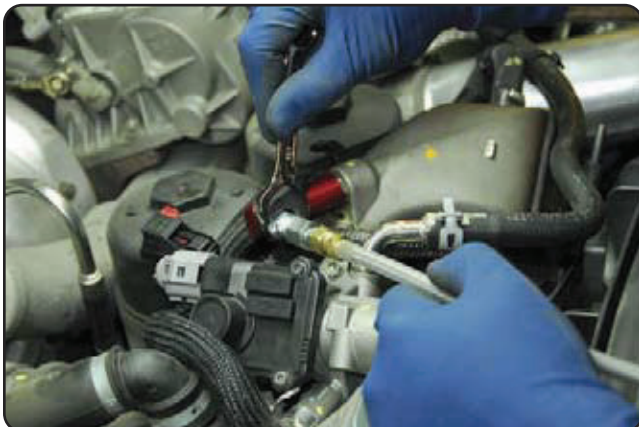
**5** Cleaning out the carbon begins with adding Diesel ISC (Induction System Cleaner) to the reservoir in the Diesel Induction Service Set.



The company's Diesel Induction Service works by liquefying crusted-on oil deposits and unburned fuel formed by EGR and PCV gases as they pass through the valve train. Once liquefied, these contaminants are burned off through the normal combustion process, with no harm to fuel-related components, catalytic converters, sensors or trap oxidizers (DPF). Note, however, that the procedure involved is fairly precise, and BG Products recommends having it done by a trained technician.



**6** The switching module for controlling the flow of cleaner to the engine is attached under the hood.



**7** A braided hose is attached to feed cleaner into the intake runners under pressure.

In addition to pouring the Induction System Cleaner into a pressurized Induction Service Tool (not into the fuel tank) on the Ford shown here, Tim Anderson also cleaned the EGR valve with a spray-on cleaner, and added two other BG chemicals to both the crankcase oil and the fuel system. Then he ran the engine for



**8** The throttle body is capped off with a special cover featuring a hose fitting that's supplied with the Diesel Induction Service Set.



**9** The cleaners flow through the intake at a designated pressure for a specified amount of time.

about an hour. He also recommends not refueling for as long as reasonable so the fuel cleaner doesn't get diluted right away.

During this process, the tailpipe might emit a large amount of dark smoke, depending on the severity of the deposits. Afterwards, both the engine oil and filter must be changed, since they become contaminated with the deposits removed by the cleaners.

The vehicle we chose to test out these claims is a 2008 Ford F-350 with 82,755 miles on the original 6.4L Power Stroke. It's owned by a Dave Morones, who runs a tile and stone cleaning business, and also does some BBQ catering on the side. (So he already has firsthand experience with removing contaminants, along with carbon buildup—on his BBQ smoker, not his engine).

While not as prone to carbon buildup as a 6.0L, the 6.4L can still experience some problems in this area (as can any other EGR-

equipped diesel engines from 2010 and earlier, Anderson points out). As evidence, a case study done by an independent facility on a 2009 F-250 with a 6.4L showed a gain of 19 hp and a whopping 40 lb/ft of torque immediately after treatment with BG's full complement of cleaners and additives. In addition, the regen cycle for the DPF increased from 121 to 244 miles, and the cycle duration dropped from 16 to 10 miles. Compression testing also indicated an average increase from 419 psi to 431 psi.

As a baseline on fuel consumption, Morones recorded the vehicle computer's readouts for mpg on long drives to and from northern Nevada and Oregon, and verified the accuracy of this data using a volume method of fuel consumption (counting the number of gallons consumed over a given distance). The average fuel efficiency before using BG Products was 15 mpg, fairly typical for this engine.

Tim Anderson of T&A Performance diagnosed the injectors' performance levels prior to performing the procedure on the engine, and found that mass fuel levels were in the dirty range (.22 gr), as was the load 20.39 percent. After treatment with the BG Products cleaners, those numbers dropped to the clean range (.13 gr and 13.73 percent, respectively). There was also somewhat less



**10** A throttle-pedal post maintains engine rpm slightly above idle for about 45 minutes while the cleaner runs through the induction system.



**11 & 12** The directional toggle and indicator lights show when and for how long the cleaner is flowing.



**13** BG 244 is a separate cleaner added directly to the fuel tank.



**14** BG 109 Compression Performance Restoration is a blend of cleaners designed to soften, emulsify and dissolve fuel gums that clog rings. Removal of these deposits should increase compression and also lower tailpipe emissions, eliminate oil consumption associated with buildup, and improve overall power and economy.





**15** Additional deposits were removed by spraying on Throttle Body and Intake Cleaner.



**16** The throttle body has noticeably less black carbon after cleaning.

fluctuation in the fuel-rail pressure. On other trucks, Anderson reports seeing gains of anywhere from two to seven mpg or more in the months following a cleaning procedure. What were the results with Morones' truck?

Well, immediately after the procedure, he reports that the engine started easier, and was noticeably quieter and required less throttle pressure to accelerate. Overall, there was a definite improvement in throttle response and drivability.

After burning a few tanks of fuel, the mpg did not significantly change, but he did notice achieving nearly the same mileage re-

sults while towing a trailer over Donner Pass, nearly 4,000 feet higher from his starting point in Reno. So, in effect the mileage performance improved slightly while the truck was under load.

Obviously your individual results will vary, but for the long haul, having a cleaner engine should make you and your diesel feel way happier. **DW**

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