

# On the Line

## Servicing Ford's Power Stroke Dealing with Aerated Fuel

**M**ajor performance symptoms occur when a diesel fuel system becomes aerated. With some systems these conditions are due to problems inherent in the system by design. Improper fuel filter installation procedures or poor lube and filter service intervals can promote the same.

The majority of Power Stroke field complaints involve the 6.0L engine. Much of this has to do with the design of the fuel injectors. Extended lube service intervals spell disaster for this system, as the injectors utilize oil as the hydraulic fluid for injector activation. This is an electro-hydraulic actuated system. Oil at a pressure range that can exceed 3,000 psi and fuel at 50 psi are supplied to each injector. The Powertrain Control Module and Injector Driver Module electrically energize the injectors. Fuel is injected into the combustion chambers at pressures ranging up to 28,000 psi. Many of the same concerns illustrated will apply to the 7.3L, 6.4L and 6.7L engines, especially priming the system following a fuel filter installation.

### COMMON COMPLAINTS

It is not uncommon to encounter an engine performance complaint following a fuel filter installation, due to aeration. Often, it is determined that the technician made a dry start, instead of priming the fuel system to fill the empty fuel filter reservoirs, prior to starting the engine. This creates some major aeration problems. And then there are cases of damaged injectors. We have seen the third set of fuel filters installed in a futile effort to resolve aeration concerns. Sometimes, the vehicle is taken to the dealer who claims that the aftermarket fuel filter has damaged the fuel injectors. They are quoted a replacement cost of \$2,400 for the injectors, plus five labor hours. The filter is not the problem, but convincing the customer can be a challenge.

### CAUSE OF INJECTOR FAILURE

The recurring aeration condition may be due to low line pressure at the bottom of the injectors. Fuel enters the fuel injector at line pressure. A minimum of 45 psi is required to prevent the intensifier/amplifier piston in the injector from bottoming out during its cycle. When it bottoms out, the piston becomes damaged and will no longer seal, allowing compression gases to enter the fuel system, promoting aeration. Fuel provides a cushion for

the internal injector components. The pressure should be between 45–55 psi and never fall below this range. The solution is an updated pressure regulator from Ford, which raises the line pressure an additional 10–15 psi.



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### OTHER CAUSES OF FUEL AERATION

- 1) Use the proper tool to remove or tighten the fuel filter cap. A cracked filter cap promotes aeration.
- 2) Position the O-ring in the proper groove in the cap and make certain it is lubed.
- 3) Running the vehicle out of fuel can permanently damage the fuel injectors, promoting aeration from the compression gases.
- 4) Improperly tightened fuel lines or fittings.
- 5) Never loosen a water drain with the engine running.
- 6) Prime/bleed the system prior to starting the engine.

### PRIMING THE SYSTEM

The following priming procedure is recommended following the installation of a fuel filter on any Power Stroke application:

- 1) Ignition switch on for 30 seconds.
- 2) Turn ignition switch off.
- 3) Repeat the procedure a minimum of 6 times.

This procedure will insure the filter reservoirs are filled with fuel. Failure to perform this procedure can result in an aerated fuel system creating some adverse engine performance symptoms and injector damage.

### SCHEDULED MAINTENANCE

Good maintenance is imperative in maintaining good diesel engine performance. Keeping the air, oil and fuel filter/filters changed is the life of the engine. Extended service intervals are not recommended for the 6.0L engine, as this system requires clean lubricant to pulse the injectors. Contaminated oil may create a condition in the injectors referred to as "stiction". This is a condition whereby the internal injector valve sticks intermittently, creating adverse engine performance symptoms. For additional information, refer to Tech Tip #169 AERATED POWER STROKE.



THE PROCEDURE IS ADVERSELY AFFECTED  
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