



# Tech Tip

DIESEL SERVICE 166

## DIESEL SERVICE It Can Be a Challenging Event

**D**iesel applications often present some challenging opportunities for the technician. Part of this challenge can be due to the technician being unfamiliar with the systems, as some shops do not get the opportunity to service that many diesel vehicles. These systems come with their own series of normal characteristics and quirks that can cause much difficulty. Sometimes problems are induced by the vehicle owner due to neglecting needed services. Simple services like changing the fuel filter can result in some major challenges. For example, dry starting an engine following a fuel filter installation means big performance problems, assuming you get the engine to start. In addition, a vehicle is often brought in for service following a botched installation of a part or improper service procedures being performed. It is imperative that you gather as much information as possible prior to taking the vehicle in for service or repair. The last thing you want to do is to accept responsibility for someone else's mistakes. Let's consider some cases where the technician can get into trouble if he is not observant.

### DIESEL EXHAUST FLUID

Make certain that the diesel exhaust fluid is installed in the correct tank.

Diesel Exhaust Fluid (DEF) is the required fluid for the Selective Catalytic Reduction System (SCR). The system reduces the oxides of nitrogen (NOx) being emitted to the atmosphere by injecting a mist of DEF fluid into the exhaust system upstream of the SCR catalyst where it vaporizes, forming ammonia and carbon dioxide. The ammonia in conjunction with the SCR catalyst converts the NOx into harmless nitrogen and water vapor. The fluid is a non-toxic solution comprised of 67.5% deionized water and 32.5% high purity urea. For a more complete description of the DEF system, refer to Tech Tip 153.

The fluid is stored in a separate tank in a capacity of 5–8 gallons, depending on the vehicle manufacturer.

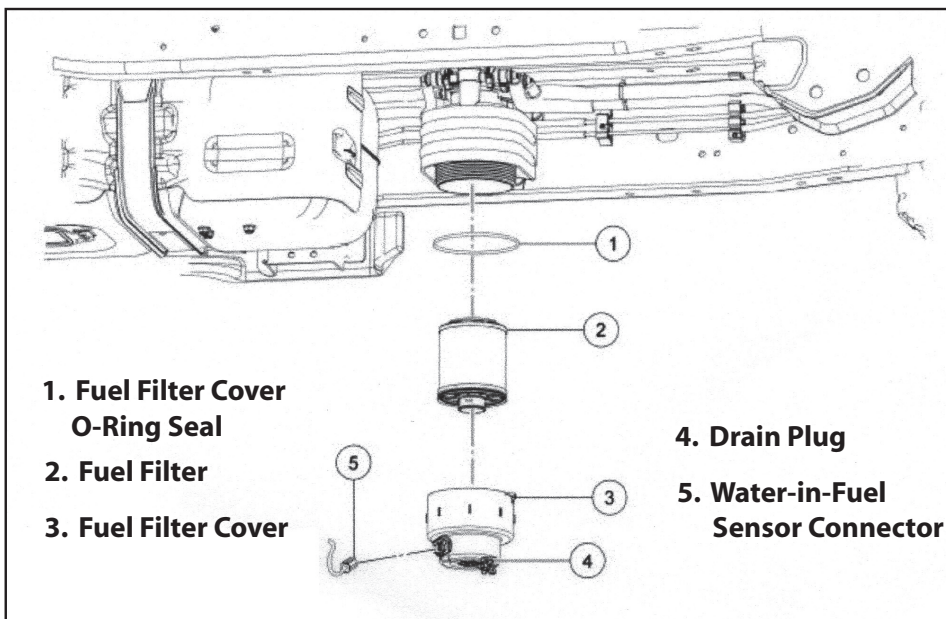
**DO NOT install DEF in the fuel tank.** The system was introduced in 2010 and we were certain there would be problems associated with the installation of the fluid. The cap is clearly marked and blue in color. Unfortunately, there have been cases of DEF being poured into the fuel tank, resulting in some costly repairs. Getting the vehicle back into service will require more than draining the fuel tank.

Ford has addressed this problem in a recent service bulletin. They advise that some 2011–2012 F-Super Duty vehicles equipped with a 6.7L turbo diesel engine may run rough, fail to start, or encounter trouble codes P1291 or P1292 due to shorted fuel injectors. This condition has been traced to diesel fuel being contaminated with DEF fluid or fuel that has gelled.

To determine if DEF has been installed in the fuel system, remove the fuel conditioning module filter (see Fig. 1). Allow the filter, filter bowl and cover to dry for a minimum of two hours. After that period of time examine the mentioned components for the presence of a white powdery residue. If these deposits are present, the complete high pressure fuel system and diesel fuel control module will require replacement and the fuel system will have to be drained and flushed. If the mentioned codes were present, examine the engine wiring harness for chafes near the EGR cooler. If no damaged wiring is present, Ford recommends disconnecting each fuel injector for the mentioned codes P1291 (injectors 1, 4, 6, 7) and P1292 (injectors 2, 3, 5, 8). Check for continuity between the injector electrical pins and the injector body. If continuity is present, replace all eight fuel injectors and the injector return hose.

Obviously, if you encounter one of these vehicles with an engine performance related symptom or the mentioned codes stored, you must make a thorough inspection. Replacing the fuel filter will not satisfy the symptoms. If the fuel system has been subjected to DEF, document any evidence of the mentioned residue on the repair order.

**Fig. 1: Fuel Conditioning Module Mounted Filter**



condition is limited to those applications equipped with a single alternator. Later model production 2012 vehicles are fitted with dual alternators and they are not included in this notice.

Premature belt wear may be encountered on the mentioned vehicles following a belt replacement or the removal of the belt to service another component.

The problem stems from the improper routing of the belt at the upper idler pulley. The belt must be routed over the upper idler pulley (see Fig. 2). If the belt is placed

beneath the idler pulley as illustrated (see Fig. 3), then belt-to-belt contact will occur, resulting in noise and premature wear.

**PREMATURE BELT WEAR**

Claims of premature belt wear have been reported on 2011 Ford F-Super Duty trucks equipped with the 6.7L turbo diesel engine, including some early production 2012 models. The accelerated wear

**SERVICE PRECAUTIONS**

Cleanliness cannot be over-stressed when servicing a diesel fuel system. Make certain all open lines are capped to prevent entry of foreign material when performing fuel system maintenance.

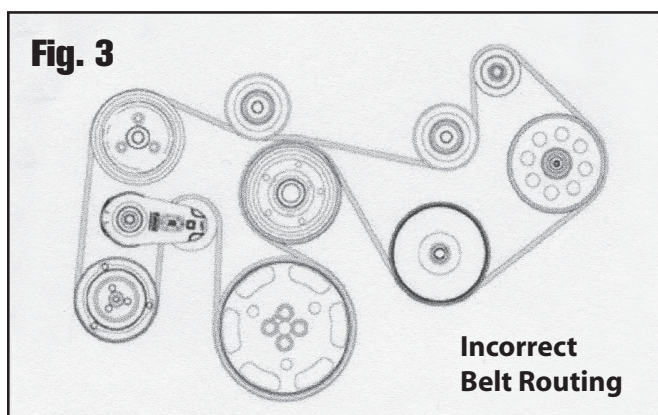
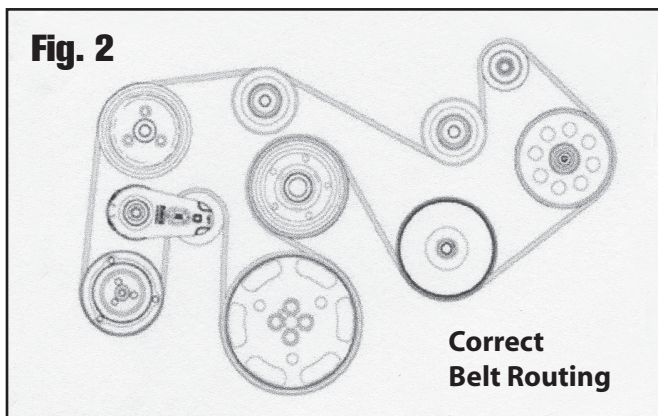
Make certain the work area and benches are clean and as dust free as possible.

When examining a fuel system for fuel leakage, avoid contact with the fuel while the engine is running. The system's high pressure may force fuel into your skin/flesh. Further, the fuel can be extremely hot, causing burns.

Allow the engine to cool and release the fuel pressure prior to servicing fuel system components.

Avoid exposed fuel injector wiring while the system is energized, as you may receive a nasty electrical shock or burn from the high voltage.

Do not apply battery voltage to a fuel injector when testing the injector.



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