On the Line

Diesel Applications

Can Pose Some Challenging Symptoms

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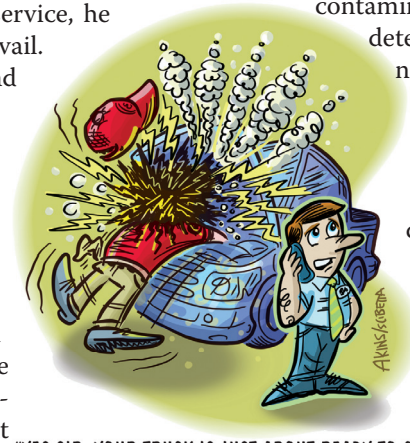
The majority of the questions and concerns that we receive regarding fuel filter installations involve diesel applications. The diesel power plants can offer some challenging experiences. Some basic precautions are necessary to prevent personal injury or to insure that the vehicle starts and runs following the service.

In addition, some of the diesel applications are encountering major system failures due to fuel contamination. When this condition occurs, you must identify the problem early on and not be drawn into a costly claim. For example: the owner of a 2011 Ford F250 turbo diesel arrives at the shop complaining of a performance symptom. He had been advised that he should get his fuel filters changed. Following the service, the technician determines that the engine has some major performance issues. Assuming that the problem is related to his service, he installs a second set of filters, to no avail. The filter supplier gets involved and after some lengthy troubleshooting it's determined that the fuel system has been contaminated with diesel exhaust fluid (DEF). This condition is not an easy problem to identify and it can have major catastrophic consequences on the fuel system components. Read on to understand how to identify the presence of the DEF in the fuel system and the system components that must be replaced.



"YES SIR, YOUR TRUCK IS JUST ABOUT READY TO GO. OUR TECH IS CHECKING THE **ELECTRICAL CONNECTIONS** AS WE SPEAK."

DIESEL EXHAUST FLUID

DEF is a non-toxic solution comprised of 67.5% deionized water and 32.5% high purity urea. This mixture of chemicals is the required fluid for the Selective Catalytic Reduction System (SCR). The purpose of the system is to reduce the oxides of nitrogen (NOx) being emitted to the atmosphere during the combustion process. It accomplishes this by injecting a mist of DEF into the exhaust system upstream of the SCR catalyst where it vaporizes, forming ammonia and carbon dioxide. When the ammonia passes through the SCR catalyst the NOx is converted into harmless nitrogen and water vapor. For a complete description of the DEF system, refer to *Tech Tip #153 DIESEL EXHAUST FLUID.*

SPECIAL TANK

The DEF system is fitted with a special tank with a capacity of 5–8 gallons, depending on the application. Heavy duty vehicles may require larger capacity tanks. The tank is easily recognizable, as is fitted with a blue cap. Unfortunately, there have been cases of DEF being poured into the fuel tank, requiring some costly repairs.

CONTAMINATED SYSTEM

Ford has recently addressed contaminated fuel in a factory service bulletin. They advised that some 2011–2012 F-Super Duty vehicles equipped with a 6.7L turbo diesel engine may run rough, experience a no-start, and display trouble codes P1291 or P1292 due to shorted fuel injectors. The cause has been determined to be diesel fuel contaminated with DEF or fuel that has gelled. To determine if the fuel system has been contaminated with DEF, remove the fuel conditioning module filter and allow the filter, bowl and cover to dry for a minimum of two hours. Then examine the mentioned components for the presence of a white powdery residue. If these deposits are present, the fuel has been contaminated with DEF. The complete high pressure fuel system and diesel fuel control module will have to be replaced and the system drained and flushed. If the mentioned codes were present, examine the wiring for chafes near the EGR cooler. If no wiring damage is present, disconnect 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.

When servicing a diesel fuel system, cleanliness is critical. Do not leave fuel lines open and unprotected, as foreign material can enter the system. When troubleshooting a fuel leak, avoid contact with the fuel while the engine is running. The system's high pressure can force fuel into your skin, requiring amputation. The fuel can be extremely hot, promoting burns. Always release the fuel pressure prior to servicing fuel system components. Avoid exposed fuel injector wiring while the system is energized, as you can receive a nasty electrical shock or burn from the system's high voltage.