



No.: 13 TS-17
May 31, 2013

TO: Service Locations

FROM: Service Operations

SUBJECT: **EPA10/GHG14 Diesel Exhaust Fluid (DEF) in Fuel System/Diesel Fuel in DEF System Contamination**

ISSUE

Major fuel system damage can occur when DEF is introduced into the fuel system. A no-start condition, engine overspeed, or engine ran backwards complaints can all be caused by DEF in the fuel system.

DEF system damage can occur when diesel fuel is introduced into the DEF system. DEF quality fault codes (SPN 3364) and NOx conversion fault codes (SPN 4364) can be caused by diesel fuel in the DEF system.

CAUSE

DEF in the fuel system is caused by accidentally adding DEF to the fuel tank. DEF is about 70% water and is not combustible. The high water content in DEF can cause corrosion and major fuel system and fuel injector damage.

Likewise, diesel fuel in the DEF system is caused by accidentally adding diesel fuel to the DEF tank. The hydrocarbons in the diesel fuel can cause seal failure in the various components of the DEF system.

Possible Symptoms for DEF in the Fuel System:

- Rust deposits
- Crystallization on fuel filters and fuel module
- Strong ammonia smell from fuel filters and fuel module
- Higher separation in fuel sample

REQUIRED ACTION

1. If DEF in the diesel fuel is suspected, ask the owner and/or driver when DEF was last added to the truck. If DEF was recently added, it is possible that DEF was accidentally added to the fuel tank.
2. Because DEF is about 70% water, the best place to check is the fuel filter module. Drain the water bowl into a clear container.
3. Next remove the fuel filters from the fuel filter module and the frame mounted housing (if equipped). Place the fuel filters on a clean work bench. Do not reinstall the fuel filter caps on the fuel filter module.
4. Observe the smell of the fuel filters and the fuel in the fuel filter module. DEF has a strong ammonia smell.
5. Inspect the inside of the fuel filter module for rust deposits.
6. Place a shop towel over the openings of the fuel filter module and frame mounted housing (if equipped) to prevent any dust collection.
7. Allow the fuel filters and fuel filter module to sit for one hour.
8. After one hour of sitting, inspect the fuel filters and fuel filter module for crystallization. Crystallization can be dark brown, light brown, or white in color. If crystallization is found, the fuel system is contaminated with DEF. See Figures 1 and 2.

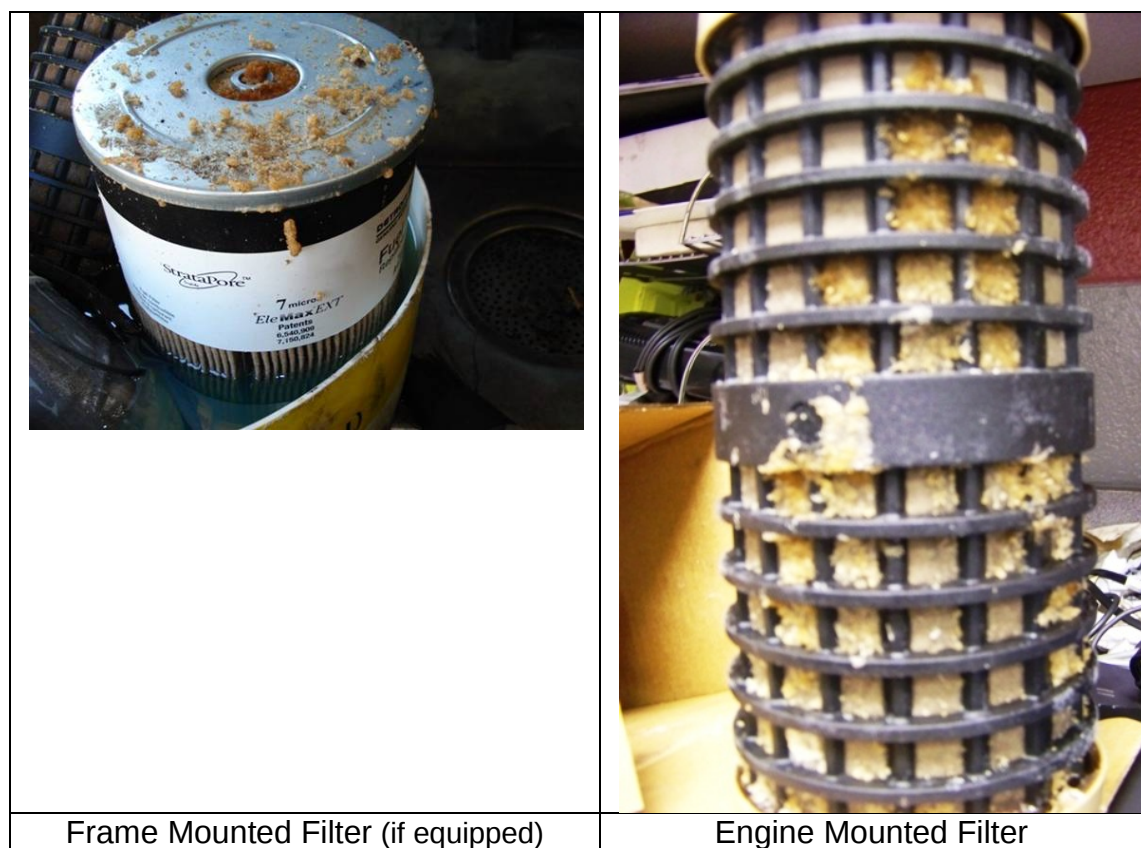


Figure 1 – Examples of Fuel Filters Contaminated with DEF



Figure 2 – Examples of Fuel Filter Modules Contaminated with DEF

9. Inspect the fuel sample that was drained from the water bowl. DEF and water are heavier than fuel and will settle to the bottom of the sample. It is possible a small amount of water and sediment will be in the sample. See Figure 3.

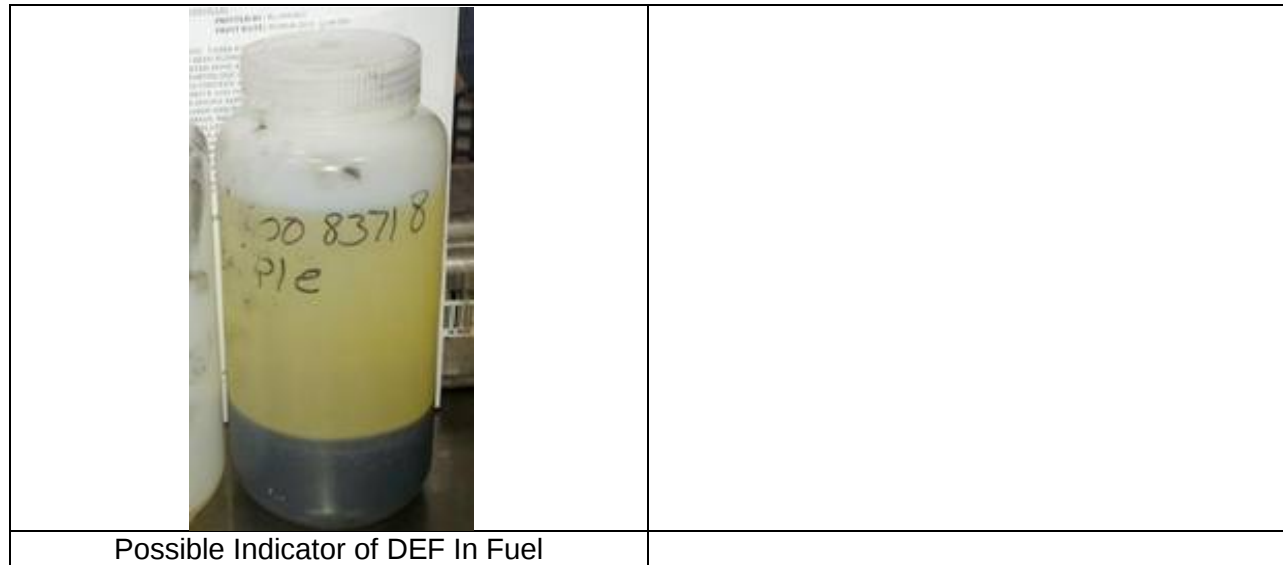


Figure 3 – Fuel Samples

ADDITIONAL INFORMATION

Fuel samples pulled from fuel tanks have proven to be ineffective in determining DEF in fuel related failures. DEF and diesel fuel do not mix. Because DEF is heavier than fuel, the DEF is pulled into the engine when it is running. The water separator/coalescer system in the fuel filter module is designed to handle a normal amount of water accumulation in diesel fuel, mainly from condensation and fuel handling. When DEF is added to the fuel tanks, this is usually a larger quantity (2.5 gal +). Because this liquid would be drawn into the fuel filter module at one time, the water separator/coalescer cannot effectively separate the DEF from the fuel at this rate. A small amount of DEF will then be trapped in the fuel filter module and some will pass through to the fuel system potentially causing damage. It is possible to have a "DEF in fuel" failure and find no evidence of DEF in the fuel tank(s). It is also possible for fuel pulled from tanks to show no DEF in a Fuel Analysis. If fuel tank samples are taken, they must be taken from the bottom of the fuel tank by using the bottom drain (if equipped) or suitable siphon equipment that can reach the bottom of the tank.

REQUIRED MATERIAL

For DEF in the fuel system failure, replace the following parts.

- Amplifier and Needle Return Lines
- Frame Mounted Fuel Filter (If Equipped)
- Fuel Filter Module
- Fuel Injectors
- Fuel Rail
- High Pressure Fuel Injector Lines
- High Pressure Fuel Pump
- High Pressure Fuel Rail Feed Lines

For diesel fuel in the DEF system failure, table 1 provides a list of parts that must be replaced.

Part Description	Comments
DEF Tank	Chassis OEM Part
DEF Tank Header	Chassis OEM Part
DEF Supply Line From DEF Tank To DEF Pump	Chassis OEM Part
DEF Return Line From DEF Pump To DEF Tank	EPA10 Only, Chassis OEM Part
DEF Line From DEF Pump To DEF Metering Unit	EPA10 Only, Chassis OEM Part
DEF Line From DEF Pump To DEF Dosing Unit	GHG14 Only, Chassis OEM Part
DEF Return Line From DEF Dosing Unit To DEF Tank	GHG14 Only, Chassis OEM Part
DEF Pump	Detroit Diesel Part
DEF Metering Unit	EPA10 Only, Detroit Diesel Part
Aerosol Line From DEF Metering Unit To DEF Nozzle	EPA10 Only, Detroit Diesel Part
DEF Dosing Unit	GHG14 Only, Detroit Diesel Part

Table 1 – Parts to be Replaced for Diesel Fuel in the DEF System

REPAIR PROCEDURE

If DEF is found in the fuel, replace the appropriate parts shown above. Reference the *EPA07/10/GHG14 Fuel Manual (DDC-SVC-MAN-0082)* for proper repair procedures. All OEM fuel lines should be cleaned or replaced if found corroded or damaged. Fuel tanks should be drained of the contaminated fuel, and the fuel disposed per Federal, State, and local rules.

If fuel is found in the DEF system, replace the appropriate parts shown above. Reference the *EPA07/10/GHG14 Exhaust – EGR - ATS Manual (DDC-SVC-MAN-0083)* for proper repair procedures.

CLAIM PROCESS

DEF in the fuel system or fuel in the DEF system are not warrantable failures. Any failures that occur to fuel system components as a result of DEF in the fuel system will not be covered under warranty or extended coverage (if any).

CONTACT INFORMATION

Please contact the Detroit Customer Support Center at 800-445-1980 or email csc@daimler.com if you have any questions.