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## Service Information Bulletin

SUBJECT	DATE
Test-E - Three-Filter Fuel System	July 2013

### Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0084	DD Platform	Test-E - Three-Filter Fuel System	Updating fuel injector hold-down bolt steps 12 and 13.



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## 2 Test-E - Three-Filter Fuel System

**NOTE:** This test is only to be performed if fuel was found in the Exhaust Gas Recirculation (EGR) hot pipe.



**WARNING: PERSONAL INJURY**

To avoid injury, never remove any engine component while the engine is running.

1. Remove and inspect the intake manifold temperature sensor, inlet manifold pressure (boost) sensor and charge air cooler outlet temperature sensor (if equipped) for signs of damage to the sensor tips. Are any sensor tips damaged?
  - a. Yes; replace the damaged sensor(s). Using DDDL 7.X or newer, record ALL fault codes and the dates the fault codes occurred. Go to step 2.
  - b. No. Using DDDL 7.X or newer, record ALL fault codes and dates the fault codes occurred. Go to step 2.

**NOTE:** Soot, oil or fuel in the air intake system can indicate the engine ran backwards.

2. Inspect the Charge Air Cooler (CAC), CAC piping, turbocharger inlet and air filter for signs of soot, oil or fuel. Is soot, oil or fuel present?
  - a. Yes; clean all soot, oil or fuel from the CAC, CAC piping, turbocharger inlet and air filter housing. Replace the air filter and Go to step 4.
  - b. No; using DDDL 7.X or newer, record ALL fault codes and the dates the fault codes occurred. Go to step 3.



**WARNING: EXPLOSION**

The air intake manifold contains combustible gas. To avoid injury from explosion, do not connect the air inlet manifold to any devices or lines external to the manifold.

**NOTE:** When SPN 100/FMI 1 Engine Oil Pressure Low, SPN 636/FMI 2 No Match of Camshaft and Crankshaft Signals, SPN 723/FMI 31 Reverse Engine Rotation Detected or SPN 1636/FMI 4 Intake Manifold Temperature Circuit Failed Low are present in DDDL, this can indicate the engine ran backwards.

3. Has SPN 100/FMI 1 Engine Oil Pressure Low occurred in the last 30 days or 5000 miles?
  - a. Yes; Go to step 4.
  - b. No; Go to step 5.
4. Remove all seven main bearings and six connecting rod bearings. Inspect the bearings for damage. Refer to section "Inspection of the Main and Connecting Rod Bearing in Chassis". Is any damage present?
  - a. Yes; replace all damaged components, then Go to step 5.
  - b. No; reinstall all bearings, then Go to step 5.
5. Drain one quart of fuel from the fuel filter module into a clear container. Measure the amount of water in the fuel. Is the water greater than half the amount of fuel?
  - a. Yes; drain and clean all fuel tanks per OEM guidelines. Go to step 6.
  - b. No; Go to step 6.

**NOTE:** Crystallization or rust on the fuel filters or in the fuel filter module is a result of Diesel Exhaust fluid (DEF) contamination.

6. Remove all fuel filters from the engine and the frame mounted filter (if equipped). Allow the fuel filters to dry for one hour. Inspect the fuel filters for crystallization. Is crystallization present on the fuel filters?
  - a. Yes; contact the Detroit™ Customer Support Center at 800-445-1980.
  - b. No; Go to step 7.
7. Review the fault codes from DDDL. Is SPN 190/FMI 0 Engine Speed High present?

- a. Yes; Go to step 8.
  - b. No; Go to step 9.
8. Review the extended fault data for SPN 190/FMI 0 Engine Speed High in DDDL. Is the engine speed 2800 rpm or higher?
    - a. Yes; for EPA07 engines, replace both camshafts, then Go to step 11.
    - b. For EPA10 engines, Go to step 10.
    - c. No; Go to step 9.
  9. Check the maximum engine speed on DDEC reports. Is the maximum engine speed 2800rpm or higher?
    - a. Yes; for EPA07 engines, replace both camshafts, then Go to step 11.
    - b. For EPA10 engines, Go to step 10.
    - c. No; Go to step 12.
  10. Using the table below, determine the need to replace both camshafts. Do the camshafts need to be replaced?

**Table 1.**

EPA10 DD13 Intake and Exhaust Camshaft Replacement	
Engine Serial Number S0062070 and lower	Replace cams if Engine Speed was 2800 rpm or higher
Engine Serial Number S0062071 and higher	Replace cams if Engine Speed was 3000 rpm or higher
EPA10 DD15/DD16 Intake and Exhaust Camshaft Replacement	
Engine Serial Number S0062139 and lower	Replace cams if Engine Speed was 2800 rpm or higher
Engine Serial Number S0062140 and higher	Replace cams if Engine Speed was 3000 rpm or higher

- a. Yes; replace both camshafts, then Go to step 11.
- b. No; Go to step 12.

**NOTE:** If any parts are missing from the engine brake rocker arms they **MUST** be found and reinstalled or replaced if damaged.

11. Did the engine speed exceed 3000 rpm?
  - a. Yes; inspect the engine brake rocker arms for loose actuator piston retainers and loose or missing return springs. Repair as necessary, then Go to step 12.
  - b. No; Go to step 12.

**NOTE:** Loose or failed fuel injector hold-down bolt(s) are normally caused by hydro-locking of the cylinder. Evidence of loose fuel injector hold-down bolt(s) can be identified by carbon/soot deposits above the fuel injector copper washer on the fuel injector body.

12. Paying attention to any loose fuel injector hold-down bolt(s), remove the fuel injectors from the engine. Are any fuel injector hold-down bolt(s) loose?
  - a. Yes; Go to step 13.
  - b. No; Go to step 14.
13. Inspect the fuel injector(s) with loose fuel injector hold-down bolt(s) for carbon/soot deposits above the fuel injector copper washer. Do any of the fuel injector(s) with loose fuel injector hold-down bolt(s) have carbon/soot deposits above the copper washer?
  - a. Yes; replace the fuel injector cup(s) on the cylinders that had a loose fuel injector hold-down bolt and carbon/soot deposits above the copper washer then Go to step 14.
  - b. No; Go to step 14.
14. Perform a cylinder leak-down test. Refer to section "Cylinder Leak Down Test ". Did all cylinders pass the leak-down test?
  - a. Yes; Go to step 15.
  - b. No; repair as necessary, then Go to step 15. If assistance is required in determining the proper repair path, contact the Detroit™ Customer Support Center at 800-445-1980.
15. Inspect the fuel injector tips for damage. Are any fuel injector tips damaged?
  - a. Yes; replace the EGR cooler. Replace all six fuel injectors. Go to step 16.

- b. No; clean the EGR cooler. Replace all six fuel injectors. Go to step 18.
- 16. Inspect the turbocharger for damage. Is any damage present?
  - a. Yes; repair as necessary, then for DD13 engines, Go to step 18. For DD15/16 engines, Go to step 17.
  - b. No; for DD13 engines, Go to step 18. For DD15/16 engines, Go to step 17.
- 17. Inspect the axial power turbine for damage. Is any damage present?
  - a. Yes; repair as necessary, then Go to step 18.
  - b. No; Go to step 18.
- 18. Inspect the EGR delta pressure venturi ports and EGR delta pressure sensor ports for carbon deposits. Are any deposits present?
  - a. Yes; clean the carbon deposits, then Go to step 19.
  - b. No; Go to step 19.

**NOTE:** Do not remove the intake manifold unless there is solid debris that cannot be cleaned with the intake manifold in place.

**NOTICE:** A fuel injector failure may result in an excessive amount of fuel contamination in the lubricating oil.

- 19. Remove the cold boost pipe or composite cold boost pipe from the intake manifold. Using a mirror and flashlight, inspect the inside of the intake manifold for debris. Is there any debris?
  - a. Yes; clean the inside of the intake manifold. Replace the lubricating oil and oil filter, then Go to step 20.
  - b. No; replace the lubricating oil and oil filter, then Go to step 20.
- 20. Review the fault codes. Is SPN 3250/FMI 0 DOC Outlet Temperature Very High or SPN 3246/FMI 0 DPF Outlet Temperature Very High present?
  - a. Yes; replace the Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF). If equipped, replace the Selective Catalytic Reduction (SCR) catalyst. Then Go to step 22.
  - b. No; Go to step 21.

**NOTICE:** Improper cleaning of the exhaust system may result in damage to the Aftertreatment System (ATS).

- 21. Remove the Diesel Particulate Filter(s) (DPF) from the Aftertreatment System (ATS). Inspect the DPF(s) and ATS for raw fuel. Is any raw fuel present in the DPF(s) or ATS?
  - a. Yes; clean the exhaust system. For 1-BOX™ emission package, replace both the DPF and the DOC/SCR module assembly. Prime the fuel system. Go to step 24. For all others, let the ATS drain for more than 10 hours. Reassemble and install the ATS. Prime the fuel system. Go to step 22.
  - b. No; clean the exhaust system. Prime the fuel system. Go to step 22.

**NOTICE:** Running the engine at high idle for one hour **MUST** be done before performing a parked regeneration. Failure to do so may result in damaging the aftertreatment system.



**WARNING: PERSONAL INJURY**

To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

- 22. Run the engine at high idle for one hour. Check for leaks and fault codes. Are any leaks or fault codes present?
  - a. Yes; repair as necessary, then Go to step 23.
  - b. No; Go to step 23.
- 23. Is any smoke coming from the tailpipe?
  - a. Yes; run the engine at high idle for a maximum of three hours or until the exhaust system stops smoking, then Go to step 24.
  - b. No; Go to step 24.

**NOTE:** Increasing the accelerator pedal position to 100% will cancel the parked regeneration and maximize airflow across the ATS for cooling purposes.



**WARNING: HOT EXHAUST**

During parked regeneration the exhaust gases will be extremely HOT and could cause a fire if directed at combustible materials. The vehicle must be parked outside.

24. Perform a parked regeneration. Monitor the DOC outlet temperature values, DPF outlet temperature values and SCR outlet temperature values. If any of these temperature values rise above 650°C (1200°F), increase the accelerator pedal position to 100% for one minute. Are any fault codes present or did the parked regeneration have to be cancelled?
- Yes, if fault codes SPN 3250/FMI 0 or SPN 3246/FMI 0 are present, replace the DOC(s) and DPF(s). If equipped, replace the SCR catalyst, then Go to step 26.
  - If fault codes SPN 3250/FMI 0 or SPN 3246/FMI 0 are not present and the parked regeneration was cancelled, Go to step 25.
  - No, repairs are complete, Test-E - Three-Filter Fuel System has ended.



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25. After a 30 minute engine cold soak from the first parked regeneration, perform a second parked regeneration. Monitor (DOC) outlet temperature values, (DPF) outlet temperature values (SCR) outlet temperature values. Did any of these temperature values rise above 650°C (1200°F)?
- Yes; Replace the DOC(s) and DPF(s). If equipped, replace the SCR catalyst, then Go to step 26.
  - No; repairs are complete; Test-E - Three-Filter Fuel System has ended.



**WARNING: HOT EXHAUST**

During parked regeneration the exhaust gases will be extremely HOT and could cause a fire if directed at combustible materials. The vehicle must be parked outside.

26. Perform a parked regeneration with new aftertreatment parts. Did the parked regeneration complete with no issues?
- Yes; repairs are complete; Test-E - Three-Filter Fuel System has ended.
  - No; contact the Detroit™ Customer Support Center at 800-445-1980.