

Aftertreatment Diesel Particulate Filter (DPF) Regeneration Test

Equipment

- JPRO® Professional or OEM Service Tool

For Component Information, click [here](#).

For Preparation, click [here](#).

For Testing, click [here](#).

Component Information

For further information on the aftertreatment system, see [Exhaust System-Overview](#).

The instructions on aftertreatment Diesel Particulate Filter inspection and stationary regeneration are included in the following procedure.

The Diesel Particulate Filter is inspected in two main steps:

- The condition of the aftertreatment DPF is determined with [Preparation](#) without removal of the filter. In order to determine if a progressive damage resulted in the malfunction of aftertreatment DPF, use [Preparation](#) procedure.
- The instructions to carry out a stationary regeneration using JPRO® or OEM Service Tool or stationary regeneration method provided by the vehicle manufacturer is explained in the [Testing](#) procedure. Carry out the [Testing](#) procedure only if troubleshooting procedures and/or engine indicator lamps indicate that it is necessary.

If the aftertreatment DPF has to be replaced, carry out the steps mentioned below prior to the replacement:

- Troubleshoot all Fault Codes and then clear them.
- Check if the fuel being used is of the correct type.
- Troubleshoot and repair any oil consumption concern.
- Troubleshoot and repair any coolant consumption concern.
- Check for concerns in the Diesel Oxidation Catalyst (DOC). See [Aftertreatment Diesel Oxidation Catalyst](#).

The Aftertreatment DPF Stationary Regeneration Test performed using JPRO® or OEM Service Tool serves the following purposes:

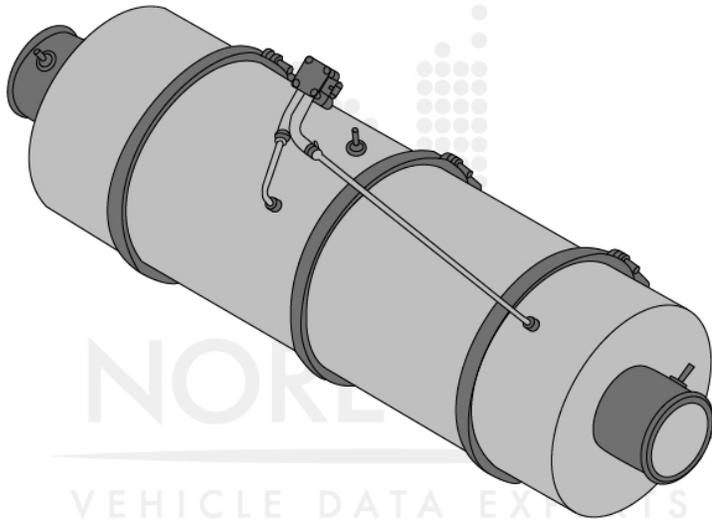
- Regeneration of an aftertreatment DPF.
- Retrieve the aftertreatment DPF and aftertreatment DOC after coolant contamination.
- Default the soot load stored in the Engine Control Module (ECM).
- Check the efficiency of the aftertreatment DOC.
- Check if the aftertreatment DOC is present.
- Inspect the aftertreatment temperature sensors for correct installation.
- Check functionality of the aftertreatment fuel injector, shutoff valve and drive train.

The functionality of aftertreatment DOC and aftertreatment DPF can be regained using the Aftertreatment DPF Stationary Regeneration Test that is performed using JPRO® or OEM Service Tool once either or both of the components are exposed to coolant. During regeneration, the coolant evaporate out of both components due to the high temperatures that are attained, and thus the components return to normal operating specifications.

NOTICE Note: Never carry out the snap acceleration test prior to carrying out the regeneration process, if these components are suspected of coolant contamination.

Figure 1. Aftertreatment DPF System

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Preparation

1. Check for Fault Codes using JPRO® or OEM Service Tool. If any Fault Code is active, carry out the corresponding troubleshooting tree prior to proceeding the following procedure.
2. In some instances, the Fault Code troubleshooting tree will redirect to this procedure for completing the diagnostics.

Figure 2. Scan Tool Testing

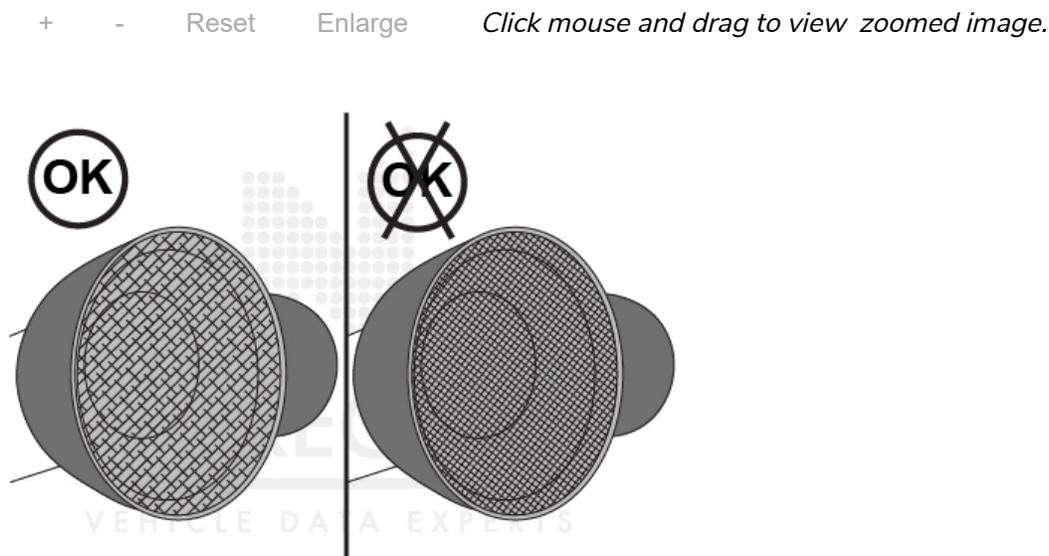
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Exhaust System Outlet Inspection

- The condition of the aftertreatment DPF can be determined through inspection of the exhaust system outlet. The exhaust system outlet must be clean and have little or no exhaust residue/soot buildup.
 - The aftertreatment DPF does not have an efficiency of 100%. It is normal to have some accumulation of exhaust residue/soot and it is not an indication that the aftertreatment DPF is faulty.
 - A malfunctioning aftertreatment DPF can be indicated through a heavy buildup of exhaust residue/soot.
3. Carry out one of the tests listed below in order to determine if the malfunctioning of the aftertreatment DPF has resulted from an exhaust residue/soot accumulation on the exhaust system outlet:
- Snap Acceleration Test. See [Snap Acceleration Test](#).
 - Clean the area at the tip of the exhaust system outlet at distance of 6-10 in (152-254 mm). Check for exhaust residue/soot accumulation at the exhaust system outlet after operating the vehicle for one shift or trip.
 - Check for concerns in the aftertreatment DPF. See [Aftertreatment Diesel Particulate Filter](#).

Figure 3. Aftertreatment DPF Filter



Testing

Warning:

- During testing, temperature of exhaust gas can become 1500°F (800 °C) and the temperature of exhaust system surface can cross 1300°F (700°C). These temperatures are hot enough for igniting or melting common materials, and can also lead to serious personal injury. Even after the vehicle has stopped moving, the exhaust components and exhaust can remain hot. Prior to beginning this procedure or repair, let the exhaust system cool down in order to avoid the risk of fire, property damage, burns or other serious personal injury. Ensure that no combustible materials are placed where they can come in contact with hot exhaust components or exhaust.

NOTICE Note: If after coolant contamination, stationary regeneration is performed for either the DOC or DPF recovery or both, the DOC need not be removed or inspected unless there are active faults that require inspection as part of the Fault Code troubleshooting steps.

NOTICE Note: Do not remove the DPF or inspect it while this process is in progress, unless it is reported that there is black smoke during operation and that the exhaust stack is black.

1. Carry out the following steps prior to executing stationary regeneration:

- a. Select a suitable location for parking the vehicle.
 - i. The surface such as clean concrete or gravel (not grass or asphalt) that will not burn or melt when subjected to high temperatures.
 - ii. There should not be anything that can burn, melt, or explode nearby.
 - There should not be anything in a distance of 2 ft (0.6 m) from the exhaust outlet.
 - There should not be anything (for instance, gasoline, wood, paper, plastics, fabric, compressed gas containers, and hydraulic lines) that can burn, melt or explode in a distance of 5 ft (1.5 m).
 - The nearby area should be clear of gas or vapors (such as gasoline vapors, oxygen, liquid petroleum gas and nitrous oxide) that could burn, explode or contribute to a fire.
 - b. Park the truck at the location securely.
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- i. Engage the parking brake.
- ii. Engage the transmission in Park (if available) or in Neutral.
- iii. Chock at least one tire of the wheels at the front and rear.

c. Provide a safe exhaust area.

- i. During regeneration, make use of barriers to keep people away (if there is a possibility that bystanders can enter the area), at a minimum distance of 5 ft (1.5 m) from the exhaust outlet.
- ii. Attach an exhaust discharge pipe while at indoors, with a rating of minimum 1500°F (800°C).
- iii. Make sure that there is a fire extinguisher nearby.

d. Inspect the surfaces of the exhaust system.

- i. Make sure that no substance such as tools, rags, grease, or debris is on or near the exhaust system surfaces.

e. Be prepared for variation in engine speed while the regeneration is in progress.

- i. Be certain not to operate any device powered by PTO. Prior to starting the regeneration process, disconnect these devices.
- ii. Keep a safe distance from the engine compartment.

f. Initiate the stationary regeneration. There are two methods to carry out the stationary regeneration:

- i. The SCR Performance Test should be carried out using JPRO® or OEM Service Tool.
 - ii. There is a manual non-mission regeneration switch on the equipment, which can be a stand-alone switch, or be used in combination with a diagnostic switch as the vehicle manufacturer may prefer.
 - iii. Start the Aftertreatment DPF Regeneration Test to perform regeneration. JPRO® or OEM Service Tool can be used for this.
 - iv. The engine is capable of producing sufficient heat to regenerate the aftermarket DPF, while following either of the methods. During the regeneration process, the engine speed increases and the turbocharger can whistle loudly. The engine will return to the normal idle speed automatically after aftermarket DPF regeneration.
 - v. Be certain to monitor the vehicle and surrounding area while the regeneration is in progress. Shut the engine OFF immediately when there is an unsafe condition.
- g. Keep monitoring the area.

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- i. Be certain to observe the vehicle and surrounding area while the regeneration is in progress.
 - ii. Turn the engine OFF immediately when there is an unsafe condition.

NOTICE Note: Engaging the clutch, brake or throttle pedal or shutting the engine OFF can stop a stationary regeneration. Exhaust gas and exhaust surface will continue to be at elevated temperatures for about 3-5 minutes after completing the regeneration.

Aftertreatment Diesel Particulate Filter Regeneration

NOTICE Note: The test is available in JPRO® or OEM Service Tool under the ECM Diagnostics Test menu.

1. Carry out the instructions displayed on the screen to execute the test.

NOTICE Note: Whenever the stationary regeneration test is to be terminated, carry out the steps given below.

- a. Access JPRO® or OEM Service Tool and select the stop button on the monitor screen.
- b. Engage the clutch (if available).
- c. Engage the brake.
- d. Engage the accelerator pedal.
- e. Shut the engine OFF.

Figure 4. Scan Tool



NOTICE Note: If scan tool is unavailable, some vehicles can be equipped with a vehicle manufacturer provided stationary regeneration method. A stationary regeneration switch in the cab is the most common type. The stationary regeneration switch can be combined with the diagnostic switch or can be a stand-alone switch, at the discretion of the manufacturer of the vehicle.

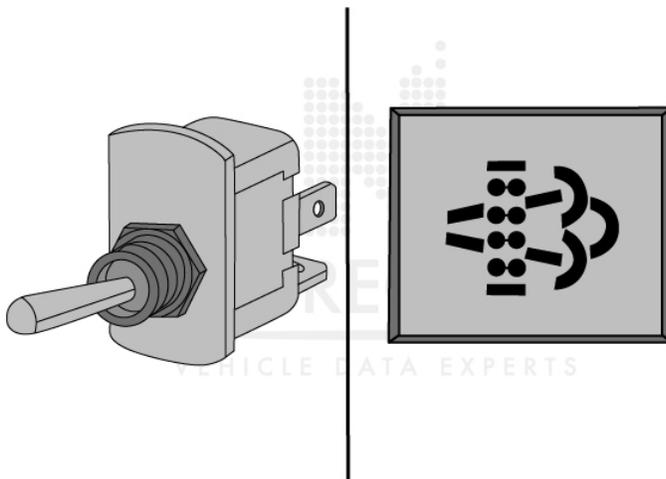
NOTICE Note: The initiations of a vehicle manufacturer approved stationary regeneration varies. See the service manual provided by the vehicle manufacturer for specific instructions.

2. Enable the stationary regeneration switch parameter in the ECM for the stationary regeneration switch to operate.

NOTICE Note: This switch will only initiate a stationary regeneration if the soot load of the filter is sufficiently high, unlike JPRO® or OEM Service Tool Aftertreatment Stationary Regeneration Test. An illuminated or flashing aftertreatment lamp indicates this.

Figure 5. Stationary Regeneration Switch

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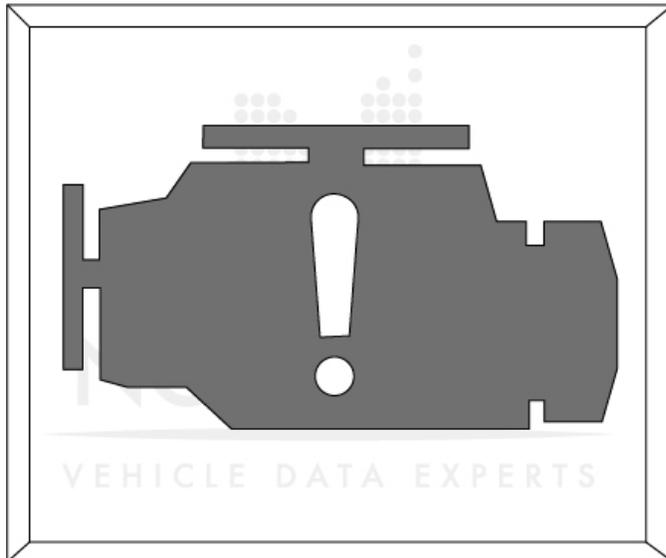


NOTICE Note: The Aftertreatment DPF Regeneration Test should not be carried out if the aftertreatment DPF soot load is indicated to be at the most severe level. The red STOP ENGINE indicator lamp will be illuminated and an active Fault Code 1922 are indicative of the most severe level.

3. Check the aftertreatment DPF. See [Aftertreatment Diesel Particulate Filter](#).
4. Follow the troubleshooting tree corresponding to the red STOP ENGINE lamp after replacing or cleaning the aftertreatment DPF for resetting the soot load value that is stored in the ECM.

Figure 6. Red STOP ENGINE Lamp

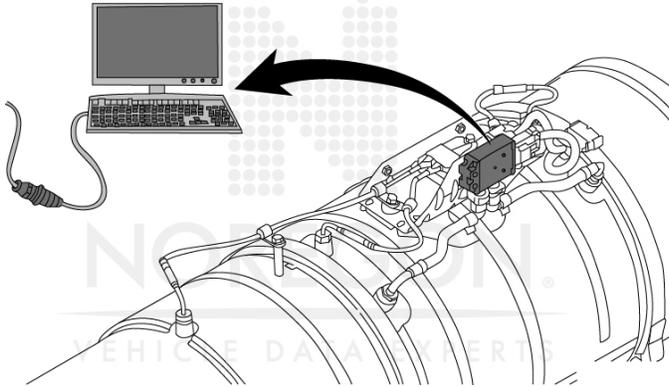
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5. The below listed conditions will be monitored during the Aftertreatment DPF Regeneration Test:
 - Aftertreatment Injector Status-Indicates when fuel is being injected in a small quantity into the exhaust system upstream of the Diesel Oxidation Catalyst.
 - Aftertreatment DPF Soot Load-Indicates the current soot load of the filter
 - Normal-Indicates that no regeneration is required.
 - Above Normal: Least Severe Level-Indicates that a stationary regeneration can be executed.
 - Above Normal: Moderately Severe Level-Indicates that a stationary regeneration can be executed.
 - Above Normal: Most Severe Level-Indicates that a stationary regeneration should be executed only under the following conditions:
 - Filter is cleaned or a new filter has been installed
 - Troubleshooting steps indicate that regeneration should be executed
 - Aftertreatment DPF Outlet Temperature
 - Aftertreatment DPF Inlet Temperature
 - Aftertreatment Diesel Oxidation Catalyst Inlet Temperature

Figure 7. Aftertreatment DPF Regeneration Test

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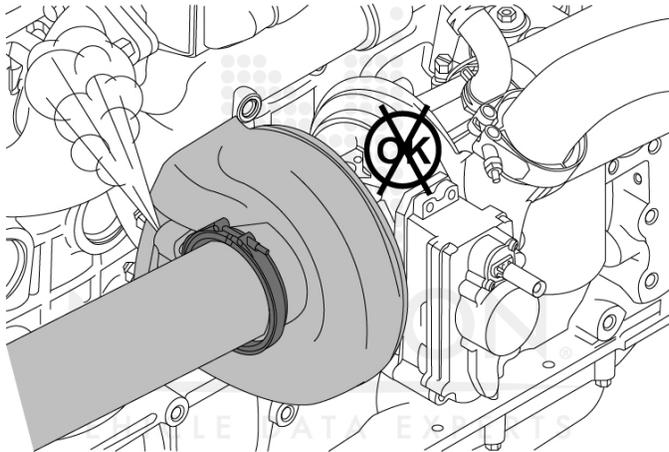


6. Check for leaks, cracks and loose connections at the exhaust piping prior to starting the Aftertreatment DPF Regeneration Test. See [Air Leaks, Air Intake and Exhaust Systems](#).
7. Tighten the exhaust clamps if required. See the service manual provided by the vehicle manufacturer for the correct torque specification.

NOTICE Note: The Aftertreatment DPF Test will tend to be having less efficiency in reducing the soot load of the filter if there is any leakage in the exhaust system. As a result, the test will run for a longer duration and may not complete.

Figure 8. Leakage In Exhaust System

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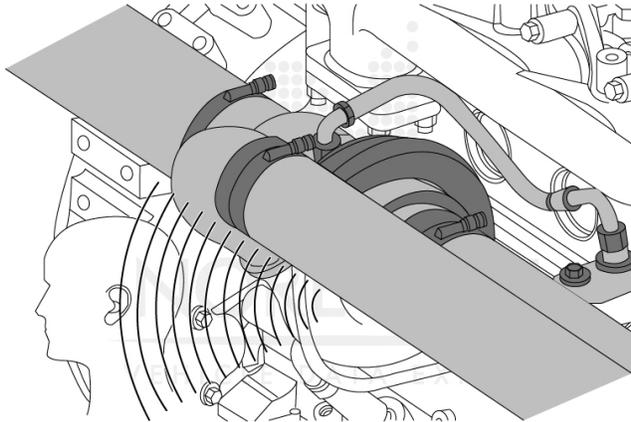
NOTICE Note: See 'Stationary Regeneration - Will Not Activate' symptom based troubleshooting procedure, if the Aftertreatment DPF Regeneration Test does not start.

8. Follow instructions displayed on the screen of JPRO® or OEM Service Tool once the Aftertreatment DPF Regeneration Test has started.

NOTICE Note: The engine idle speed will increase automatically to the expected level once the test is started. The engine will run in such a manner that exhaust heat is brought up through the engine controls. It is normal during the test that the turbocharger produces a slight whining noise. The engine comes back to the normal idle speed automatically after completing the Aftertreatment DPF Regeneration Test.

Figure 9. Check for Whining Noise

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9. After completion the test, check for the following concerns:

- o Check if any active Fault Code is present
- o Check for high aftertreatment diesel particulate soot load in the engine indicator lamps after executing the Aftertreatment DPF Regeneration Test.
- o If there is any active Fault Code, carry out the appropriate troubleshooting tree for the Fault Code.

Figure 10. Engine Indicator Lamps

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