A Truck Driver's Guide to Care and Maintenance of Diesel Particulate Filters (DPFs)

California Environmental Protection Agency
Air Resources Board

Disclaimer: This handbook is not a substitute for the detailed instructions/warranty limitations supplied by the manufacturer or the conditions contained in the applicable Air Resources Board (ARB) executive order.

Don’t Let Your Filter Get Out of Kilter!

- Your truck is retrofitted with a Diesel Particulate Filter (DPF). The emissions performance of this retrofit has been verified by ARB through rigorous testing.
- Keep in mind that a DPF is not a “fit and forget” device. Protect your investment by understanding the needs of your new system.
- Improper care of your engine and DPF can lead to:
  - Expensive repairs and replacement parts
  - Voided warranty
  - Engine malfunction or breakdown
  - Non-compliance with air pollution laws
- Maintain engine in its original configuration.
- Do not exchange filter parts unless allowed by the DPF manufacturer.

Vehicle Maintenance is Critical

Top notch vehicle engine maintenance is required. Loss of lube oil control or over-fueling can damage or destroy your DPF leading to expensive repairs. A DPF captures soot from the engine and can mask engine problems that were formerly detectable by observing exhaust smoke characteristics. Be proactive. Reducing soot from your engine reduces filter plugging and cleaning.

Fuel injectors: Repair and replace at intervals required by the engine manufacturer's maintenance schedule. Worn fuel injectors can lead to excessive fueling and more soot generation and accumulation in the filter. Fix worn hydraulic injectors to stop lube oil leaks into the fuel.

Air filters: Replace at intervals required by the engine manufacturer. Dirty air filters reduce air flow to the engine leading to more soot generation.

Turbocharger: Check turbocharger for proper operation and excessive wear. Turbochargers that do not produce sufficient air or have leaking seals lead to more soot or the presence of lube oil in the exhaust.

Fuel filter: Replace at prescribed intervals. Look for the presence of lube oil in the fuel filter during regularly scheduled maintenance. A blackening of the filter may indicate that oil from the crank case is mixing with the fuel due to a leaky injector.

Fuel: Periodically inspect fuel in the on-board fuel tank for signs of lube oil contamination (black in color). Inspection should be done prior to refueling. A blackening of the fuel may indicate mixing of crankcase oil with the fuel.

Coolant: Monitor coolant consumption. Keep a log of the coolant added to the engine. Coolant leakage can poison the DPF catalyst and/or cause filter plugging.

Lube oil: Change the lube oil at mileage intervals indicated by the engine manufacturer. Track usage.

Monitor Lube Oil Consumption Closely

Some of the components in lube oil can collect in the DPF and cause plugging or make the catalyst malfunction. Therefore, it is important to ensure that the engine is not consuming lube oil at a rate higher than recommended by the engine manufacturer.

- If the lube oil consumption exceeds specifications the engine must be repaired.
- Increased lube oil consumption leads to increased ash load and filter plugging. The ash cannot be removed by regeneration. The result is an increase in DPF cleaning frequency which is costly and involves downtime.
- Track lube oil usage by keeping a log of how much oil is added to the engine between oil changes.
- Low ash (CJ-4) lube oil is recommended.
- Never put clean or used lube oil, additives, or alternative diesel fuels that are not authorized by the DPF manufacturer in the fuel tank.

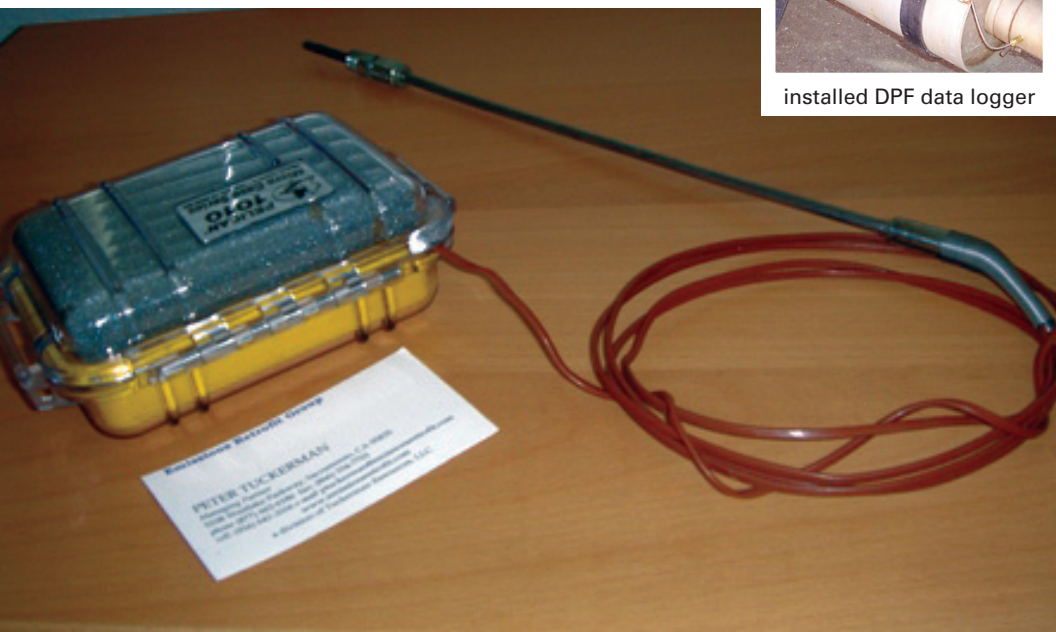
Maintain the Proper Engine Duty Cycle

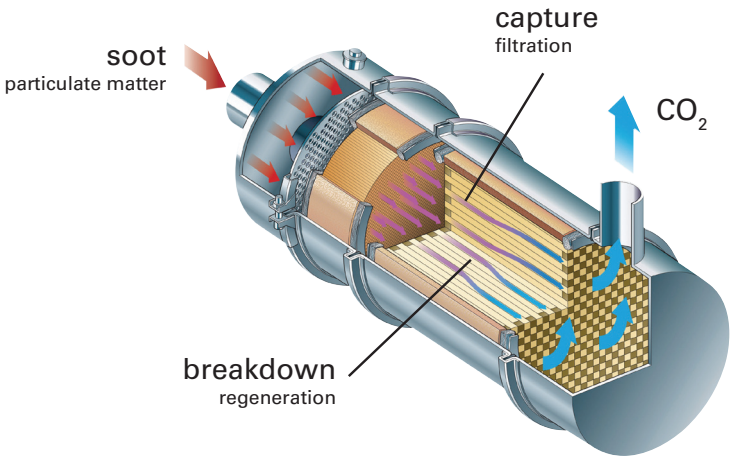
The duty cycle is the daily pattern of use of the engine and how that affects the engine exhaust temperature. The duty cycle, for example, could vary between highway driving long distances to city driving with short trips with light or heavy loads. Before the DPF is installed, the engine is data logged to determine if the engine exhaust is hot enough to have the filter run properly. The DPF is designed to work for the duty cycle at the time it was data logged. Therefore, changing the duty cycle could adversely affect the performance of the filter.

- Maintain the duty cycle that was used when the truck was data logged by the installer.
- Be aware that if the duty cycle of a truck is changed, it may affect how the filter works, leading to plugging.

installed DPF data logger

DPF data logger





Understanding Your DPF's Regeneration System

The DPF collects soot from the engine exhaust. This must eventually be removed to keep the filter from clogging. The process of burning the soot in the filter is called regeneration. High temperatures for a specified amount of time are required for the DPF to be regenerated properly. Your truck is equipped with a passive or active regeneration system.

Passive regeneration – In this system, the engine exhaust temperature gets hot enough to trigger regeneration during vehicle operation.

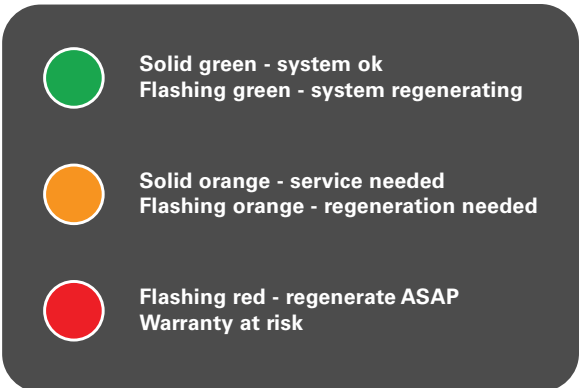
Active regeneration – This system requires an outside source of heat energy, such as diesel fuel or electricity, to burn-off accumulated soot. This process may or may not require action by the driver. Some DPFs, for example, automatically dose and ignite diesel fuel in the filter for regeneration. DPFs equipped with electrical plugs use heaters that are required to be plugged into an electrical outlet for a regeneration and this is typically done overnight.

- Make sure that actively regenerated DPFs are given the required regeneration time, so the soot can be completely removed from the filter before the vehicle is driven again.
- Actively regenerated DPFs should not be parked near flammable materials when the regeneration takes place. The DPF gets very hot and could cause combustibles to catch on fire.

Understanding the DPF Monitoring System

The cab of the truck features a monitoring system for the DPF that includes several indicator lights that show the status of the filter. The operator must understand and observe the DPF indicator lights on a regular basis and respond accordingly.

- The indicator lights for the monitoring system vary somewhat between DPF manufacturers. Understand the meaning of all indicator lights by talking to the installer or maintenance personnel.
- Do not disconnect, tape over, or block the view of indicator lights.
- Do not ignore indicator lights. Continuing to operate a vehicle that requires attention may severely de-rate the engine, damage the DPF and/or engine, and void the DPF warranty.
- For actively regenerated DPFs, perform regeneration or return to the garage for regeneration as soon as possible when required by the indicator light(s).
- If the installer provides a quick reference card for the DPF indicator lights, keep a readily accessible copy in the truck.



Handle the Filter with Care

- The DPF appears rugged but is commonly made with ceramic materials.
- Make sure the DPF is handled properly during installation.
- Never bang or tap on the filter because this could crack the filter element.
- Replacing the DPF filter element is costly. Cracking the filter element may void the warranty and requires replacement.
- When working on your vehicle, do not weld any other components on the retrofit system or cut or disconnect any control lines.

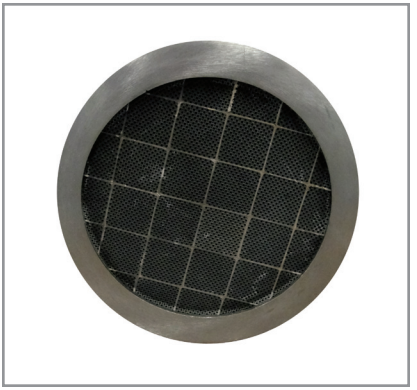
DPF Cleaning Basics

The DPF is a maintenance item. It must be removed and cleaned periodically to remove accumulated noncombustible ash from the filter.

Ash removal is different and separate from regeneration. In general, DPF cleaning requires heating the filter, using compressed air combined with a vacuum system to blow the ash, and capturing it in a sealed container.

- Only use filter cleaning procedures approved by the DPF manufacturer.
- Using an improper cleaning method may ruin the DPF and/or expose personnel to hazardous waste.
- Do not use shop compressor in open area to clean filter.
- Do not steam clean the DPF.
- Do not rap on the filter element to remove ash.
- Unless it has been tested and verified as safe, DPF ash must be handled and disposed as a California hazardous waste.
- Make sure filter cleaning contractors use the proper procedure and handle ash properly.
- Make sure that filter elements are installed correctly after they are cleaned. Do not reverse the filter elements.
- Never operate the engine without the filter elements.
- Maintain service records.

clean filter: no action necessary



dirty filter: requires ash removal

DPF cleaning machine

Resolving DPF Related Problems

The DPF is a mechanical device and occasional problems may arise due to factors related to manufacturing, installation, or engine maintenance practices. Use the following protocol to resolve DPF related performance or reliability problems.

For Trucks & Buses (Including Drayage/Port Trucks)

Step 1: Contact your installer
Most problems are resolved in this manner

Step 2: Contact the device manufacturer
If the installer cannot resolve your complaint

Step 3: Contact ARB at 866-6DIESEL or *8666Diesel@arb.ca.gov*
If the installer or manufacturer cannot resolve your complaint

For Transport Refrigeration Units (TRUs or Reefers)

Contact ARB at 1-888-878-2826 or *tru@arb.ca.gov* and contact your installer and/or manufacturer.

For more information

web *www.arb.ca.gov/truckstop*
email *8666diesel@arb.ca.gov*
phone 866-6 DIESEL (866-634-3735)

July 2012