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The Best Ways To Extend The Life of Your DPF System

In the ongoing quest to protect the environment in the early 2000s, the EPA set its sights on heavy trucks, calling for a reduction in diesel particulate emissions. The Diesel Particulate Filter- the DPF System – was born. This is an important – and expensive – piece of equipment. You want it to last as long as possible, so it's worth it to know what you should and should be doing to maximize the working life of your DPF system.

How It Works

Mounted in the exhaust system, the DPF's job is to clean up particulate matter or soot created from incomplete combustion of the fuel. DPFs are commonly made from ceramic or other materials. The diesel exhaust gasses pass through the filter's honeycomb structure, with as much as 90 percent of the solid particle matter (soot) getting trapped in the filtering medium. This cleans up the exhaust to the point where a clean linen handkerchief placed over the exhaust remains completely clean and doesn't even smell of diesel exhaust.



DPF Regeneration Modes

As the vehicle is driven, the engine gets hot, and so does the exhaust system. This heat causes the DPF catalyst to burn the trapped soot away into non-polluting gases in a process called "**Passive Regeneration**". Passive regeneration is an ongoing process - it occurs automatically when the exhaust gasses are hot enough, and is not noticeable to the driver.

If the vehicle operates only on short runs, or is idled for long periods of time, the exhaust never gets hot enough to trigger the catalytic reaction of passive regeneration. If the system goes too long without a passive re-gen, soot will accumulate and raise the exhaust backpressure, triggering the "**Active Regeneration**" process. Here, the engine will artificially increase the exhaust temperature to burn off the particulates while the driver is driving.



There's a third process called **Manual Regeneration**, when a vehicle is never driven long enough for the engine to initiate active regeneration. Now, it must be initiated manually by the operator. The vehicle is parked in a secure area, and the engine increases its rpm and artificially adds heat until the soot is burned away.

Most common DPF problems

The DPF system does a wonderful job, but can be expensive to repair. And there are certain things that can shorten its life and increase your repair bills.



Sintering - A primary contributor to DPF problems comes from non-carbon ash accumulation in the filter, mainly from sulfur content of the fuel as well as lube oil components. This metallic ash is never burned off, but rather accumulates in the DPF over time until you end up with a clogged filter. This can become a big issue in the high heat of the regeneration process, which can cause the metal ash particles to simply fuse into solid masses in a process called sintering. Now, the DPF must be removed from the vehicle and physically cleaned of ash. This can only be done at a service facility.



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Damage To The Monolith - The key element in the DPF is one piece of ceramic – called the ceramic monolith - that must retain its integrity in order to cause the diesel exhaust to pass only through the fine-filtering walls of the ceramic material. If it is cracked, either through poor handling by the technician, through vibration, or because the driver has driven over something like a railroad line, it will allow diesel particulates to the downstream side of the filter. The last thing you want is a technician removing the filter from the exhaust system and banging it on the shop floor to clear out accumulated ash.

Oil or Fuel Contamination – Another cause of early DPF repair can be through an engine problem, like a turbo failure that allows lube oil into the filter matrix, or a leaky injector that loads it with raw fuel. Both of these problems will block the through-the-wall flow of exhaust and produce a sudden rise in backpressure. Either problem can spell trouble for your DPF.



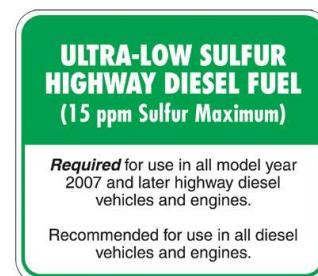
Things you can do to make your DPF last longer & prevent problems

1. Regular DPF cleaning goes a long way

Having your filter removed and cleaned regularly increases its lifetime. This step should be an important part of your regular maintenance schedule.

2. Be sure to use the correct fuel

Too much soot leads to premature clogging and longer/more frequent change cycles for the DPF. One way to counteract this issue is to focus on removing any controllable sources of soot or particulate matter. Use a quality fuel additive that reduces soot and unburned carbon output. Another particular controllable source is the amount of sulfur in fuel. Continuous use of diesel fuels containing more than the recommended 15 ppm of sulfur will cause a poisoning effect of the catalyst in the exhaust system, which shortens the life of the expensive filter.



3. Use the right kind of oil

To meet 2007 emissions requirements, engine oil manufacturers developed a new oil standard: CJ-4. The standard for pre-2007 oils is CI-4 Plus, which was designed to meet regulations for engines made before 2004. What makes CJ-4 more compatible to newer engines? The difference is lower levels of phosphorous, ash, and sulfur. Using older CI-4 oil is used in a newer engine could prematurely plug up the diesel particulate filter (DPF), increasing maintenance issues and causing you to have to replace the DPF much earlier than anticipated.

4. Pay attention to both oil levels and oil change intervals

Oil change intervals can have a huge impact of the longevity of the DPF system. If the manufacturer says to change oil at 6,000 miles, you should change it at 6,000 miles. Those numbers aren't just pulled out of the air. Engines are tested extensively to arrive at those intervals. You also do not want to overfill the crankcase with oil, as this excess can clog the filter.

5. Do re-gen the right way

Regeneration processes can be interrupted, and that's bad for the system. If you override the regen, you risk compaction in the DPF. Overriding a manual regeneration can happen if you touch the brakes or accelerator pedal or put the vehicle in gear during the regen. This causes a suspension of the regeneration process. Do this too often and you risk serious consequences with your DPF.