

Diesel Particulate Filters (DPF's) Explained

Customer Information - Non-Technical

Since about 2010, Diesel Particulate Filters (DPF's) have been mandatory on all Diesel Car and Light Commercial Vehicles in the UK, some Manufacturers installed them from as early as 2004, before they were part of the MOT test.

These Soot Trap Filters are there to trap the black diesel smoke, normally associated with old or worn diesel engines. Just like any type of filter used in almost any application, these filters get full and have to be cleaned or replaced at some stage during the vehicles lifetime.

DPF's are part of the vehicle's exhaust system and at first glance appear similar to most of the other silencer boxes. Some DPF's are accessible when installed under the vehicle whilst others are fitted very close to the engine or suspension and steering components, removing these can be extremely difficult and costly.

DPF's normally have two pressure outlets, one before and one after the filter (some only have one before the filter) these are connected to a differential pressure sensor. The vehicles ECU (Electronic Control Unit) monitors long term changes in pressure and calculates when the DPF needs its soot fill to be reduced and the ECU to initiate its Active DPF Regeneration (cleaning) process.

The 3 types of DPF Regeneration are; Passive, Active and Forced.

Passive Regeneration occurs naturally when a vehicle is driven hard, frequently reaching peak engine torque resulting in high exhaust gas temperatures (EGT's). Under these conditions, diesel soot (unburnt diesel) instantly burns on the hot surface of the DPF and prevents the filter from blocking. This hard driving style is the surest way of keeping your Diesel Particulate Filter clean.

Active Regeneration This is when the vehicles ECU attempts to regenerate the DPF due to high differential exhaust pressure readings, high exhaust gas temperatures and calculated DPF soot content readings. The ECU will only, (on most vehicles), enter this cleaning mode when there are no DTC's (Diagnostic Trouble Codes) present and there are no pending fault codes either stored in the vehicles ECU. Be aware, some DTC's may still be present in the ECU but not all DTCs bring on the EML (Engine Management Light) and a Dealer Level Scan Tool might be required to read these.

DPF Active Regeneration only occurs when certain conditions are met, the engine's coolant temperature for example must be at least around 60 degrees and the DPF core temperature be at a minimum 180 degrees. The vehicle must have at least 15L of fuel on board and then has to be driven for at least several miles at a minimum road speed of usually above 30 mph (50 kph) or higher.

Some online info suggests certain vehicles should be driven at engine speeds above **** rpm and in a certain low gear for **** number of miles and that DPF regeneration will automatically take place, this is just total nonsense. The vehicle will only enter it's DPF regeneration mode **when it wants to** or **when it needs to**, so don't believe everything you read on GOOGLE.

Forced Regeneration is what most garages will try to do (if the vehicle allows them to) when a vehicle is presented to them with high DPF differential pressure readings and a high soot content. A vehicle specific Scan Tool must be used to first delete all relevant engine DTC's and to then command the vehicles ECU to initiate its DPF regeneration process. During this controlled cleaning cycle, diesel is injected into the DPF (either directly or indirectly) where it ignites and burns with the normally available oxygen, this ignites the stored soot and core temperatures in excess of 500 degrees celsius are reached in order to regenerate the diesel particulate filter whilst turning the soot into ash.

Warning, this regeneration process on most vehicles results in diesel fuel entering the engine oil past the piston rings, diluting the oil and leading to poor lubrication which sometimes causes engine failure.

If your DPF still isn't clean after maybe having gone through at least one of the above cleaning cycles, it's probably too restricted, or at the end of its life, you now have only 4 available options.

1. Attempt a chemical on the car DPF clean, this sometimes works but it typically costs around £300 and even if this is successful, it usually comes with a no money back guarantee.
2. Have the DPF removed from the vehicle and sent away to a specialist DPF cleaning company for forced, low pressure, high flow, reverse flush cleaning. This typically costs £300 **plus labor charge to remove the unit**, even though the unit usually comes back clean, there are no guarantees it will stay that way.
3. Fit a new DPF from the vehicles manufacturer, low-cost aftermarket ones don't always work as they don't always reach the required DPF "burn off" temperature inside the specified time period so sometimes regeneration may be aborted by the ECU if the temperature rise is slower than expected.

DPF removal and ECU Re-Map deletion service.

4. Some garages offer a DPF removal and ECU Software solution. For MOT purposes the DPF cannister must still be present and there must be no visible evidence of tampering to indicate the core of the DPF may have been removed. The engine must still be able to pass its MOT smoke (opacity) test, some ECU remapping companies offer an alternative "low power, low smoke map" just as a temporary solution for the vehicle to pass it's MOT test.