P2003: DIESEL PARTICULATE FILTER EFFICIENCY BELOW THRESHOLD BANK 2

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Advanced
Repair Cost	:	**$100-$3000**
Can I Still Drive?	:	No

What Does The P2003 Code Mean?

The DTC relates to an emissions control device called a diesel particulate filter. Installed on 2007 and later diesels, it eliminates the soot emitted from their exhaust. You will most likely see this DTC in a Dodge, Ford, Chevrolet, or diesel pickup, but it can also be triggered on other diesel cars such as VW, Vauxhall, Audi, Lexus, etc.

The DPF – diesel particulate filter – is in the shape of a catalytic converter and positioned in the exhaust system. Inside is a matrix of compounds coating the passages such as cordierite, silicon carbide and metal fibers. It's 98% effective at eliminating soot.

The DPF creates a slight back pressure in operation. The vehicle's ECU — computer — has pressure -feedback sensors on the DPF to monitor its functionality. If for some reason – for two running cycles – it senses a discrepancy in the pressure limits, it will set the code P2003 indicating a malfunction.

Not to be to concerned, these devices have a regenerative capability to burn off the buildup of soot and return to full service. They last a long time.

Once this occurs the light will go out and the code will clear itself. This is why it's called a soft code — it indicates a fault in "real time" and erases as the fault corrects itself. A hard code remains until the repair is completed and the code erased manually with a scanner.

All vehicles need a device to eliminate oxides of nitrogen expulsion into the atmosphere, which wouldn't be there otherwise, and its harmful to your health as well as the atmosphere. A catalytic converter solves emissions on gasoline engines. Diesels on the other hand, are more problematic.

Relying on the heat of super compressed fuel for spontaneous combustion, their cylinder head temperatures are very high creating a serious breeding ground for oxides of nitrogen. NOx is produced under extremely high temperatures. The engineers knew that they needed to use EGR — exhaust gas recirculation – to dilute the incoming fuel charge to reduce the head temperatures and reduce the Nox. Problem was, the exhaust temperatures on a diesel are to high and would simply compound the problem.

They corrected this by using engine coolant to cool the engine oil and EGR pipe to reduce cylinder head temperatures below that necessary for the formation of Nox. This worked quite well. The DPF is the last line of defense against emissions by eliminating the soot.

NOTE: This P2003 DTC is the same as P2002, however the P2003 refers to bank 2, which is the side of the engine that does not contain cylinder #1.

What Are The Symptoms Of The P2003 Code?

Symptoms of a P2003 DTC may include:

- A drop in fuel economy occurs as the engine management system attempts to increase the temperature of the exhaust to burn off the excess soot in the DPF
- The check engine light will be on with the code "P2003." The light may stay on or light intermittently as the DPF regenerates. The engine will be sluggish on acceleration.
- The engine oil will exhibit dilution from the ECUs attempts to increase engine temperature. Some vehicles advance the fuel injection timing slightly after top center to afterburn a small amount of fuel to increase exhaust temperatures. Some of this fuel enters the crankcase. When the ECU determines the necessity to regenerate the DPF, the service life of the oil be shortened significantly
- If the DPF is not cleared the ECU will revert to the "Limp Home Mode" until the situation is corrected

What Are The Potential Causes Of The P2003 Code?

The causes for this DTC may include:

- Too much slow speed operation will cause this code. It takes heat in the 500c to 600c range to burn off the soot in the DPF. Even with the ECUs efforts in engine management, it has difficulty in creating enough heat to clear the DPF at slow engine speeds
- An air leak forward of the DPF will change the sensor readings resulting in the code
- Defective ECU strategies or components will prevent proper regeneration

- Fuel with a large percentage of sulfur will clog the DPF quickly
- Some aftermarket accessories and performance modifications
- Dirty air cleaner element
- Damaged DPF

How Can You Fix The P2003 Code?

The solutions are somewhat limited since the DPF is not defective, only temporarily clogged with particulates from soot. If the light is on and the code P2003 is set, use the process of elimination starting with a visual inspection.

Inspect the DPF on Bank #2 for loose connections on the engine side where it mounts to the exhaust.

Inspect the differential pressure sensors located on the front and rear of the DPF (bank 2). Look for burnt wires or loose or corroded connectors. Pull the connectors apart and look for bent or corroded pins. Make sure the sensor wires are not resting on the DPF. Start the truck and look for leaks on or around the unit.

If everything is good in the above steps, then drive the truck for approximately 30 minutes at highway speeds in order to raise the exhaust temperature enough to regenerate the DPF. Personally, I have found that idling the engine at 1400 rpm for approximately 20 minutes has the same results.

If the problem still persists after driving at highway speeds, the best thing to do is take it to a shop and have them place it on a diagnostic computer such as the Tech II. This is not expensive and they can watch the sensors and the ECU in real time operation. They can see the signals from the sensors and if the ECU is in fact attempting the regenerating process. The bad part is quickly identified.

If you do mostly in-town driving and this is a recurring problem, there is another solution. Most shops can reprogram your computer to prevent the regenerating process in a few moments. Next, remove the PDF and replace it with a straight pipe (if legal in your jurisdiction). Problem solved. Don’t discard the DPF however, it is worth a lot of money should you sell it or need it in the future.

NOTE: Some modifications such as “cold air intake” (CAI) kits or cat-back exhaust kits may trigger this code and may also affect your manufacturers warranty. If you have such modification and have this code, put the stock part back in place and see if it causes the code to go away. Or, try contacting the kit manufacturer for advice to see if this is a known issue.

Reference Sources

P2003 Diesel Particulate Filter Efficiency Below Threshold B2, OBD-Codes.