




JLR Architecture - Oil Dilution DPF Blockage Explained.png

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Introduction

1. This document is designed to advise Sales staff as to the limitations of the 5 JLR architectures with reference to customers whose typical drive journey is with low average speed and short duration drive cycles (Rural/Urban). This will assist Sales staff during the customer qualification process by helping to recommend the correct powertrain for their needs.

2. JLR Diesel vehicles have to meet the emissions targets set out by EU6. As a result a system of soot capture and burn off has had to be incorporated into the existing architecture from 16MY onwards. This has resulted in some engineering challenges with the current layout of the architectures, affecting the proximity of the heat source (engine) to the filter and so its ability to complete the burn off of the soot in the Particulate Filter. This process is known as **Regeneration**.

JLR Architectures

3. JLR has 5 architectures currently and, simply they refer to the underside, chassis and engine elements of the vehicle known as the "Go-Cart". The architectures in general use by JLR are as follows:

D2a (XJ), *medium coupled, may suffer from Oil Dilution.*

D6a (F-TYPE). *Petrol only, so unaffected.*

D7a (XE, XF, F-PACE, and Velar), *close coupled so minimal or no effect.*

D7u (RR, RRS and Discovery), *medium coupled, may suffer from Oil Dilution.*

D8 (Evoque, Discovery Sport and E-PACE), *70cm apart, partially masked by a bullhead. This will be heavily affected by Oil Dilution and DPF blockage and is likely to be more common for low speed, short duration drive cycles.*

Oil Dilution

4. The impact of the distance between the heat source and the filter can lead to failed attempts to regenerate and, as a result, so oil dilution occurs. The soot is burnt off by effectively supplying extra fuel to the filter and then igniting it to burn off the soot.


5. This process takes around 20 minutes. However, if this is interrupted by shutting down the vehicle part way through, the additional unburnt fuel, which has been injected during the process, will go into the sump and mix with the oil and therefore dilutes it.

6. The vehicle calculates the oil dilution based on an algorithm from the data of what the vehicle has done in terms of journeys duration and failed regens. In this way the vehicle calculates how much fuel will have been transferred to the oil. When that reaches 7%, now moving to 10%, this will illuminate the oil service light in the instrument cluster.

DPF Blockage

7. In addition to oil dilution, if the customer routinely drives for less than 20 minutes at less than the speed (40mph) required to induce the engine temperature, the vehicle may continually fail to regenerate and the filter will then become blocked.

8. When the filter is nearing the blocked state, the customer will receive an Amber warning in the instrument cluster and is advised to drive the vehicle for 20 minutes at an average of 40mph to complete a regeneration. If they do this the filter will clear but this will not rectify the oil dilution.



Summary

9. In summary, if a customer has a diesel vehicle listed above and uses the car in a typical low-speed, low-duration drive cycle (Rural/Urban), they will suffer from oil dilution as a minimum but also in many cases will have blocked DPFs. To avoid these issues, we strongly recommend that customers should be advised to choose an equivalent petrol vehicle or an alternative JLR diesel model that supports the customer drive cycle better and minimises their risk of having oil dilution or blocked DPF filter problems.

It is also worth clicking the link below to a short video which helps to explain it to a customer.

<https://www.youtube.com/watch?v=euVnAvl88U8>

