



# Motronic Training Document for the calibration of the DPF diagnostic function via PM sensor



**BOSCH**



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|----------|-----------------------------|----------|-----------------------------|
| reviewed | BEG-PT/EAD1-Schliemann Mike | approved | BEG-PT/EAD1-Schliemann Mike |
|----------|-----------------------------|----------|-----------------------------|

| Edit. | Changes                              | Editor           | Date       |
|-------|--------------------------------------|------------------|------------|
| 1     | FINISHED V01 - BASED ON SGL-FILE V18 | BEG-PT/EAD-Linke | 31.03.2013 |

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# 1 Introduction and basic principles

To minimise the particulate emissions of a diesel engine, diesel particulate filters have been used since the introduction of stricter emission standards. In the particulate filter principles a distinction is made between two ways of functioning. On the one hand, the wall flow filter, also known as a closed system in which the exhaust gas flows through a porous wall. Two regeneration processes are used to oxidise the soot stored in the wall flow filter. The passive and the active DPF regeneration. In the case of wall flow filters, the oxidation process during active regeneration is considerably more prominent and more important than the soot reaction during passive DPF regeneration. To regenerate the DPF actively, the temperature upstream of the particulate filter is increased to about 600..670°C. This temperature provides the conditions for thermal soot oxidation.

Partial flow filters are the other type of filter. They consist of thin, metal foils equipped with special flow control technology. The soot is guided into pockets by the flow control technology and stored there. Partial flow filters are usually regenerated only passively. The principle is based on the soot being able to be burnt with NO<sub>2</sub> at temperatures of 300..450°C. The process works reliably at these temperatures when the mass ratio of NO<sub>2</sub> to soot is greater than 8:1. This is referred to as the CRT (continuously regenerating trap) effect. The partial flow filters have a filtration efficiency of 20..60%. If the filter is completely full, its filtration efficiency will drop to 0%. Partial flow filters are often installed as retrofits because no special measures are required to increase the temperature and thus no intervention in the combustion calibration is required in the engine ECU.

**This MTD is based on systems with wall flow filters. At present we know of no system with partial flow filter and PM sensor. This combination also appears to be unlikely for the future.**

Wall flow filters have a filtration efficiency of more than 95% for all particulate sizes. They are broken down into surface and depth filters. Surface filters include sintered metal and honeycomb filters. It consists of channels sealed by ceramic plugs that force the flowing exhaust gas to pass through the porous filter walls. Filtration is done by depositing the particulates on the channel walls.

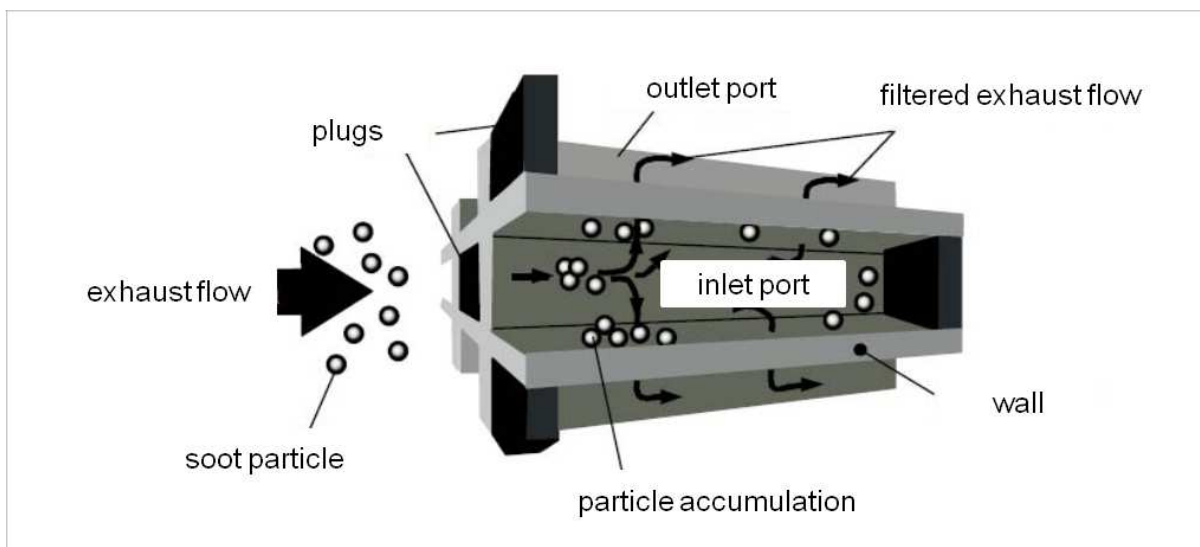


Figure 1: Functional principle of soot wall filter

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