



## Gasoline Particulate Filters

GDI engines tend to produce more particulates than PFI engines. This is because there is less time for the fuel to evaporate and mix inside the combustion chamber.

A gasoline particulate filter is an after-treatment system applied to an engine to capture and control the particulate matter in the exhaust. It acts as a store and converts carbon-based particulate, or soot, into carbon dioxide by burning it. We tend to see higher particle numbers in GDI engines - which creates the need for gasoline particulate filters.

We have seen an uptick in the adoption of GPFs as a result of emissions legislation and regulations in Europe and China. But at the moment, they are not required in North America – as emissions regulations do not include particle number limits.

Gasoline Particulate Filters are a relatively new addition to the GDI vehicle fleet. They are similar to Diesel Particulate Filters in that they need heat and oxygen from the exhaust gas in order to regenerate and convert soot stored in the filter to Carbon Dioxide. If they do this during the normal course of driving, then it is called 'passive regeneration'. Gasoline engine exhaust gas is normally so hot, that typically there's no problem for a GPF to passively regenerate. However, where drivers do consistently short journeys, particularly in cold weather, or in a market with certain fuel characteristics, this can lead to the GPF being overloaded with soot.

Fuel injectors with a build-up of deposits have been shown to increase particulates, increasing the risk for those drivers I mentioned who do short distances. To counter this, the GPF may need to be 'actively regenerated' by retarding the combustion phasing in the engine, providing extra heat to the GPF. This subsequently clears built up particulates. Unfortunately, changing the combustion timing in this way always carries a fuel economy penalty. Having good quality fuel with deposit control additives will be essential to prevent deposits, maintain robust GPF performance and minimise fuel consumption in all conditions.

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