Increasing tight PN emissions regulations affect Gasoline Direct Injection (GDI) engines in addition to Diesel. Gasoline Particle Filters are potential solutions to comply with the tight legislation requirement on PN. Even if some learnings from the development and application of particulate filters to Diesel engines can be transferred to gasoline engines, the particulate composition, the mass to number ratio and the temperature as well as the gas composition of gasoline engines are significant different to Diesel engines. Therefore, there is the need to study the application of gasoline particulate filters (GPF) in depth.

The current work summarizes the performance of an uncoated GPF placed in 2 different locations – Close-coupled (CC) and under-floor (UF) in two identical vehicles (Opel Zafira) with a 1.6 litre GDI engine displacement. Both vehicles are running on road over a pre-defined cycle that reflects the “average customer behaviour” up to 200k km. Data on GPF PN filtration performance over lifetime are reported as well as ash accumulation vs. mileage and backpressure.

The two Zafira Tourer were driven over an “average customer cycle” on road, a combination of city (1500km), country and highway (1500km) mode.

PN emissions measurements over WLTP were performed every 20k km together with GPF weighing and GPF CT scan to monitor GPF performance and evaluate ash accumulation vs. mileage up to 200k km. The average fuel consumption over the “average customer cycle” was ~ 9.6 l/100 km (Super RON 95) and oil consumption in the range 0.02-0.03 l/1000 km.

Uncoated NGK GPF medium porosity ~ 48% and mean pore size ~12µm.