Innovative Gasoline Particulate Filters: A Comprehensive Analysis of Intrinsic High Filtration Rates and Operational Performance

Danilo Engelmann, Marko Göpfert, et.al

AFHB, Berner Fachhochschule, Gwerdstrasse 5, Nidau, Switzerland
danilo.engelmann@bfh.ch

This scientific contribution explores a novel class of gasoline particulate filters designed with an intrinsic high filtration rate. Distinguished from conventional vehicle particulate filters, the enhanced filtration efficiency of these filters is achieved through a unique pore structure, eliminating the dependence on soot layer buildup for optimal performance.

The inherent characteristics of these innovative filters make them particularly suitable for application in gasoline engines and other applications where particle mass is minimal but ultrafine particles such as viruses. The paper meticulously compares conventional filters lacking a specialized pore structure with the newly developed filters, discussing disparities in filtration efficiency over time and under varying load conditions.

Furthermore, the study presents a comparative analysis of the filters' performance in both diesel and gasoline engines, conducted on a test bench and within the context of actual vehicle operation. This research sheds light on the transformative potential of these advanced filters in redefining filtration standards across diverse operational scenarios.

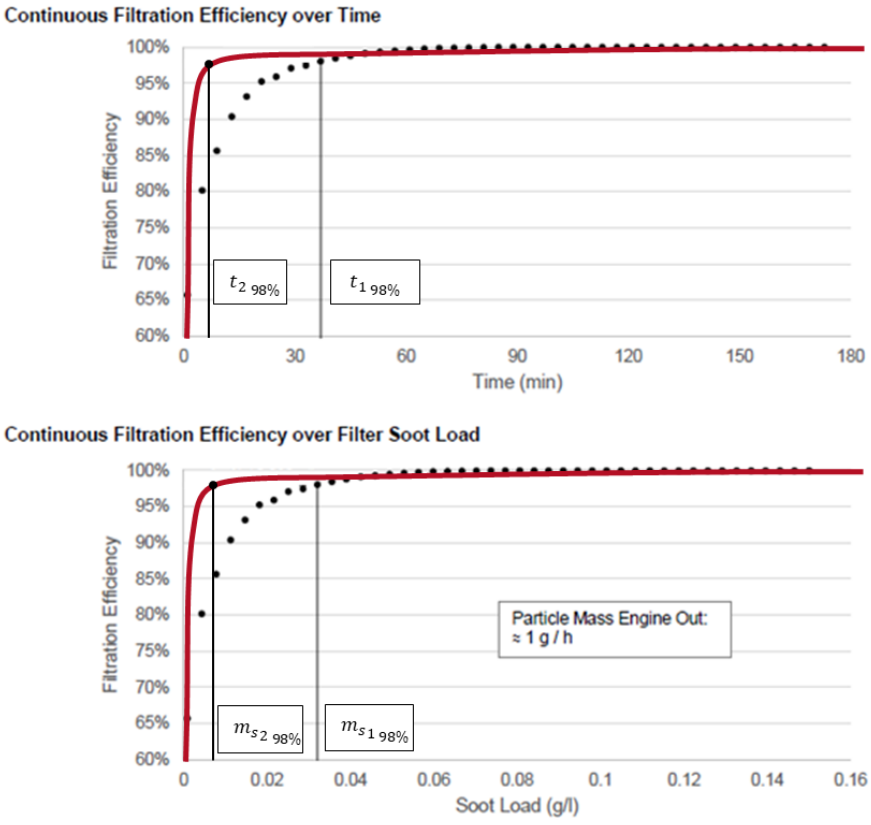

Figure 1: Filtration of the novel (red, full) and conventional filters (black, dotted) depending on the time and loading of the filter