Automotive Solutions

Laboratory Case Study

Diesel Particulate Filters
for Cleaner Air

Laboratory for IC-Engines and Exhaust Emission Control at the University of Applied Sciences (AFHB)

Measuring of exhaust emissions

Particulate matter determination with filter weighing

Berner Fachhochschule
Technik und Informatik

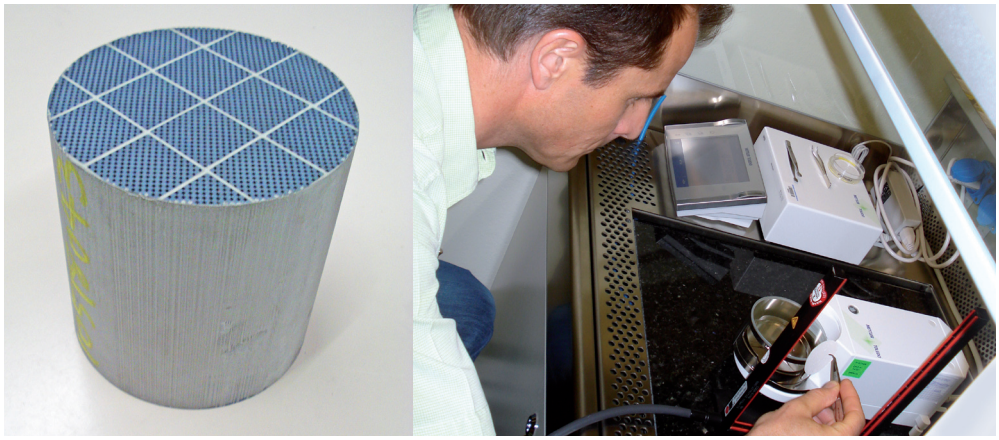
Diesel particulate filters (DPF) have been mandatory in Switzerland for all construction vehicles in use. The laboratories of AFHB in Biel are the only one in Switzerland that approve new diesel particulate filters. The XP2U Ultra Micro Balance with filter and anti-static kit is the ideal solution for this application.

DPF obligation for construction vehicles

Today, many countries have implemented particulate matter limits for new on- and off-road vehicles but diesel particulate filters are obligatory for existing off-road vehicles, such as construction machines, in only a few countries. Since 2003, diesel particulate filters are mandatory in Switzerland for construction vehicles with more than 37 kW power and the

XP2U Ultra Micro Balance

METTLER TOLEDO



An example of diesel particulate filters for construction vehicle.
Mr. Comte performs filter weighing.

obligation was extended in 2005 to construction vehicles with power between 18 kW and 37 kW.

30 years of experience

The Laboratories for Internal Combustion-Engines and Exhaust Emission Control at the University of Applied Sciences (AFHB) in Biel measure exhaust emissions and approve these diesel particulate filters in Switzerland for 30 years. In 1979, the labs started with fundamental exhaust emissions research and official measurements of directly imported vehicles. Today, the official measurements performed are for emission controls of all vehicles up to 3.5 t and for the retrofit systems used in on- and off-road vehicles, such as diesel particulate filters.

"We test up to 20 retrofit diesel particulate filters each year," Pierre Comte, lab manager, says. "Among Nitrogen Oxides, Hydrocarbons and Carbon Dioxide and nanoparticulates, we in AFHB measure Particulate Matter (PM)", he continues. The particulate matter of DPF testing is sampled on 70 mm filters. First, the filter samples are prepared by conditioning for 24 hours in a clean room chamber with controlled humidity and temperature and then weighed. After the sampling procedure, the samples are again conditioned for 48 hours and weighed. The mass of particulate matter is then calculated on the basis of the differential weight. The AFHB determines PM gravimetrically by using a XP2U Ultra Micro Balance from METTLER TOLEDO.

Outstanding performance

The XP2U Ultra Micro Balance with filter kit is the ideal balance of choice for this application. With a readability of 0.1 µg, the differential weighing application, the tailored filter weighing kit for 47 mm and 70 mm filters and the ergonomic design, the XP2U Ultra Micro Balance provides uncompromised weighing accuracy, consistency, convenience and efficiency. The robust stainless steel housing eliminates air turbulence and heat transfer, therefore ensuring a faster stabilization time and better weighing performance.

Initial problems at AFHB with electrostatic filter loading, as result of the filter separate as handling, could easily be solved with the anti-static kit. The U-antistatic kit is driven by the balance and discharges filter samples quickly and efficiently. Before the filter is placed on the weighing pan, it is passed through the U-electrode of the antistatic kit and looses all electrostatic charges.

Mr. Comte and his colleague, Thomas Hilfiker, have been positively surprised by the weighing speed and fast stabilization time of the XP2U Ultra Micro Balance. The filter weighing solution enhances the speed of filter weighing and gives them more time for other important tasks.

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