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Soot Generators for Filter Testing and Instrument Calibration - An Update

The rapidly growing industry of exhaust particle filtration and its new focus on Diesel exhaust and similar sub-micrometer particles creates the need for new development tools such as those involved in the controlled generation of soot aerosol. In a typical application, a new filter material or catalyst design is tested by loading it with particles from a soot generator located upstream the filter sample under test. Before, during and after loading, particle characteristics such as size distribution and surface chemistry are measured upstream and downstream of the filter sample to investigate how it reduces or changes the particles. Internal combustion engines usually cannot provide the level of stability and reproducibility of particle size and concentration required for this application. An alternative are dedicated soot generators based on the combustion or pyrolysis of fossil fuel. The synthetic aerosol mimics Diesel exhaust particles in average size and size distribution. Further requirements are a high soot mass output of several g/h to shorten filter loading times, and the ability to work against the rising backpressure of a loading filter.

This paper introduces an example of a new soot generator, explains its principle and reviews first results from performance measurements.

Short C.V.

Markus Kasper is Partner and Managing Director of Matter Engineering, a company providing services and equipment for nanoparticle sampling, measurement and calibration. Key products are the rotating disc thermodiluter and soot particle generators for filter development and testing. MK has been appointed scientific adviser to the Swiss government within the UN/ECE Particulate Measurement Programme (PMP) which is currently evaluating a new number-based measurement standard for particle emissions from Diesel vehicles. To this evaluation phase, Matter Engineering has provided the "Golden Instrument" as reference equipment.

MK graduated in physics from the Swiss Federal Institute of Technology in 1995. In 1998 he was awarded PhD in the group of Hans-Christoph Siegmann with a thesis on the effects of ferrocene on soot formation in flames. In 1998 he joined Matter Engineering as sales manager and became Managing Director in 2001.

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