Aerosol Sensor Test System

AFC 135

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The Aerosol Sensor Test System AFC 135 combines the features of the successfully established test systems for filter media and elements (AFC 131/ AFC 132). Additionally the range of application ius extended to the development, testing and calibration of sensors for number or mass-related determination of the particle loading of aerosols (PMx-and PNx- sensors).
The wide field of application is made possible on the one hand by the flexible sensor integration (active and passive sensors) and on the other hand by the realisation of a wide volume flow range. On customer request, the test system can be equipped with 2 measuring sections to cover volume flow rates between 0,8 – 40 m^3/h and 40 – 450 m^3/h.

Applications

- calibration and quality assurance of PM sensors during production
- testing of PMx and PNx fine dust sensors during development
- studies on the ageing behaviour of sensors
- aerosol-technical fundamental research

Features

- Providing stable, defined aerosols at variable volume flow rates
- generation of solid and/or droplet aerosols
- adaption to customer-specific requirements possible
- integration of Topas equipment and external devices

Principle of operation

The main components of the test system are: a controlled blower to generate the main volume flow, a measuring duct divided into 3 sections, an aerosol generator (ATM 222) to generate the test aerosol and a laser aerosol spectrometer (LAP 323) for the reference aerosol analysis.
The blower sucks ambient air through the measuring duct via a pre-filter. Thereby exposing the air in the first duct section to a test aerosol. A distribution system ensures an optimal distribution of the test aerosol in the measuring duct.

Simplified principle of operation of the AFC 135 with an exemplary filter holder for sensors.

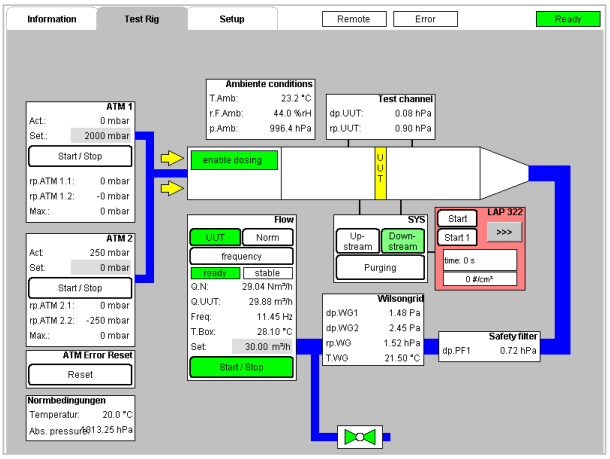
At the end of the measuring duct, an exchangeable sample holder is located for the sensors to be tested, for example, as well as an isokinetic sampling probe through which the test aerosol is fed into a reference measuring device.

Specifications

In the standard version of the test system, a laser aerosol spectrometer (LAP 323) is used to detect the particle size distribution and particle number concentration in the test aerosol.

Details

The test system is highly flexible in its design. On customer request, different sample holders, an alternative reference particle measuring device as well as a storage shelf can be offered.



User surface of test system control and data acquisition & data processing software AFC135Win.

A multi-functional software (AFC 135Win) developed by Topas is offered for the test system. The software is Windows-based and enables the visualisation and control of the AFC 135 as well as the acquisition and processing of the generated data. For research purposes, the software can be operated in expert mode. The user can approach all implemented instruments of the test system, adjust their settings and record and evaluate the relevant data. Further software options are the consideration of calibration functions of various devices as well as the display of relevant measured values on the user surface.

Various sample holders of the AFC 135 for sensors, sampling probes, flat media and other components.

Technical specifications

volume flow rate	0,8...450 m^3/h
inner diameter of the measuring duct	150 mm
aerosol substance	DEHS, Arizona Test Dust A1 ultrafine (ISO 12103-1), TopFog, PSL, PAO
measuring concentration	5...1 000 $\mu g/m^3$ (@ 100 m^3/h)
sensors for	Δp, T, RH, p_{Baro}
underpressure after sample	max. 100 hPa (@ 450 m^3/h)
power supply	400 V AC, 25 A
air supply	max. 10^6 Pa (10 bar)
LAP 323	
measuring range	0,15...40 µm
measuring concentration	< 10^4 cm^{-3}
underpressure	max. 30 hPa
dimensions (B x H x T)	2,3 m x 1,5 m x 0,9 m
weight	ca. 400 kg