TOPAS®
Technologie-orientierte Partikel-, Analysen- und Sensortechnik

Fractional Efficiency Measurement System

FMS 375

Fractional efficiency measuring system FMS 375.

The fractional efficiency measurement system FMS 375 bundles core competences of Topas in one compact and robust instrument for highly-resolved aerosol analyses regarding particle size and concentration.

The FMS 375 enables in one device i) an automated aerosol sampling as well as excess air refeeding via a switching unit, ii) aerosol conditioning by two dynamic dilution systems and iii) a precise aerosol characterisation based on the aerosol spectrometer LAP 325.

Applications

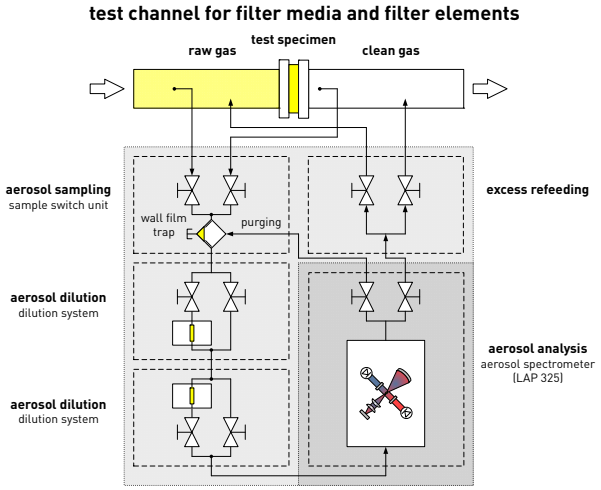
- characterisation of particle size distributions of aerosols
- evaluation of fractional separation efficiency of oil mist separators and filters
- compact design for the use at engine test stations or in laboratory test setups (e.g. SPT 140)

Features

- operable at both over and lower pressure
- automated and remote-controlled operation
- mobile use (optional trolley kit)

Principle of operation

By means of two flexible sampling lines, the FMS 375 is connected to the sampling points. The automated switching unit allows a controlled sampling via the different sampling lines. After sampling, the aerosol conditioning takes place. Two cascaded dynamic dilution systems enable a defined reduction of the concentration level over several orders of magnitudes. The present raw gas concentration defines the necessity for none, one or two dilution systems for lowering the concentration towards the acceptable concentration range for the aerosol spectrometer.



Principle of operation of the fractional efficiency measurement system FMS 375.

Afterwards, the conditioned aerosol passes the measuring cell of the aerosol spectrometer.

The measurement zone is illuminated by light of two different wavelengths, which originates from two laser diodes with high lifetime. The light, which is scattered by the particles or droplets, is collected and recorded by a photodetector.

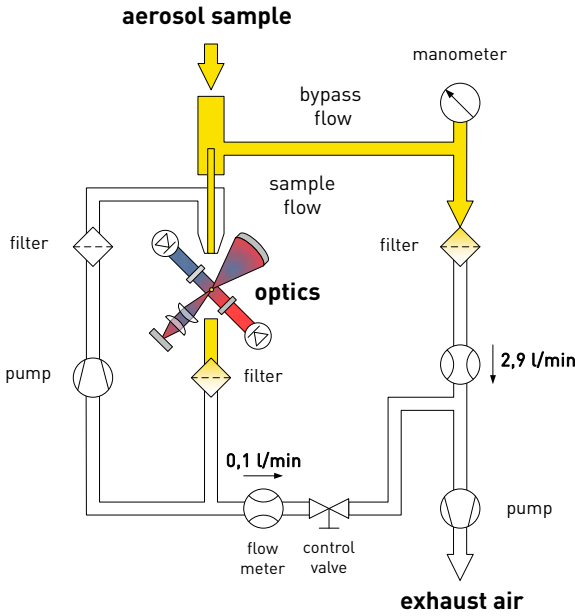
Topas GmbH
Technologie-orientierte
Partikel-, Analysen- und Sensortechnik
Gasanstaltstraße 47 · D-01237 Dresden

Telefon +49 (351) 21 66 43 - 0
Fax +49 (351) 21 66 43 55
E-Mail office@topas-gmbh.de
Internet www.topas-gmbh.de

TOPAS-GMBH.DE
PARTICLE UNDER CONTROL

Specifications

The optical signals are converted into electrical ones and are processed by a microcontroller. Signal evaluation is performed by the firmware. Results like the particle size distribution and the particle number concentration are visualised on a display.



Principle of operation of the laser aerosol particle size spectrometer LAP 325.

During analysis, the excess flow rate is continuously refed into to test channel. The excess flow refeeding guarantees a constant flow rate through the test channel. Accordingly, aerosol sampling does not affect the pressure drop over the test specimen.

The implemented dilution is based on the dynamic dilution principle of Topas. For the FMS 375, the principle was automated and components pressure-resistance designed. The dilution is adjustable, while no additional dilution air is required.

By weighing out the good accessible absolute filters of the bypass flow and the sample flow path of the aerosol spectrometer, an additional gravimetric evaluation of the aerosol sample is possible.

The FMS 375 can be operated as stand-alone device via the firmware and the integrated display.

The instrument can also be operated by a computer and the instrument software PASWIN via the serial interface.

Application example

The FMS375 is typically used for the characterisation of fractional separation efficiency of separators in engine or oil mist separation test systems. During testing, an oil-containing droplet aerosol is fed into to a flow channel. The test aerosol is analysed down and upstream of the oil mist separator. The fractional separation efficiency is computed from the up- and downstream particle concentration ratio.

Accessories

- pneumatic hose with quick coupling adaptor (DN 5)
- trolley kit (optional)

Technical specifications

sample flow rate	3 l/min
analytical flow rate	0,1 l/min
size range	0,2 ... 40 µm
concentration range	< 4×10^8 cm^{-3}
aerosol inlet	8 mm (outer diameter)
temperature range	max. 120°C
pressure range (inlet)	max. ± 800 mbar
power supply	110 ... 240 V, 50 ... 60 Hz
compressed air supply	4 bar ≤ p < 8 bar
data interface	ethernet, USB
dimensions (w × h × d) w/o grip with grip	 530 × 440 × 500 mm 650 × 570 × 500 mm
weight (w/o accessories)	33 kg
normative references	ISO 17536 series of standards; VDI 3867-4:2020 (E); ISO 21501-1:2009

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E-Mail office@topas-gmbh.de
Internet www.topas-gmbh.de