TOPAS®

Technologie-orientierte Partikel-, Analysen- und Sensortechnik

Laser Aerosol Spectrometer

LAP 323

Laser Aerosol Spectrometer LAP 323.

With the new single particle scattering light spectrometer LAP 323 the innovative dual wavelength technology of Topas GmbH for particle size and number determination is implemented.

The use of two laser diodes with different wavelengths allows a high-resolution detection of even small spherical particles and their accurate classification. Additionally, the aerosol spectrometer is characterized by integrated sampling, intelligent volume flow control and compact design. The Laser Aerosol Spectrometer LAP 323 meets all technical requirements for aerosol spectrometers as described in ISO 21501-1 and VDI guideline 3867 part 4.

Applications

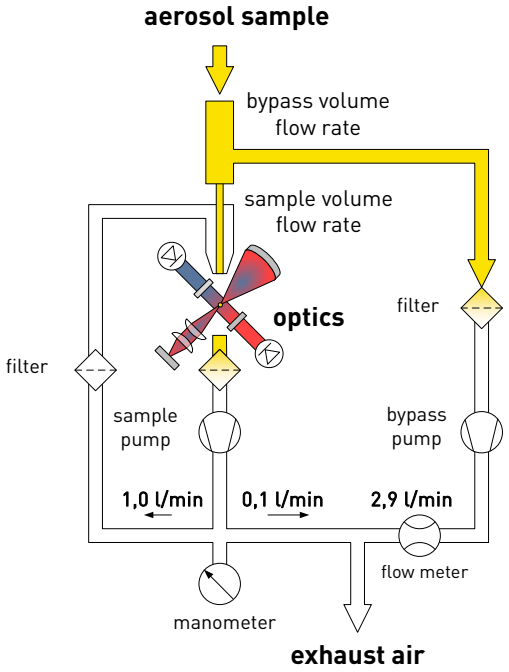
- high resolution analysis of aerosols
- filter testing and filter characterization
- analysis of test, calibration and pharmaceutical aersols
- particle size determination of sprays, oil mists, dusts and powders

Features

- very high classification accuracy within the particle size measurement range
- homogeneous and high illumination intensity in the measuring volume for an optimized lower detection limit
- avoidance of border zone error through optimized measuring cell design
- verification of mass concentration using a removable bypass filter

Principle of operation

The Laser Aerosol Spectrometer uses an internal pump for the suction of the sample volume flow rate into the device. The volume flow rate is divided and only a small amount is directed into the measuring cell.



Schematic description of the operating principle of the LAP 323.

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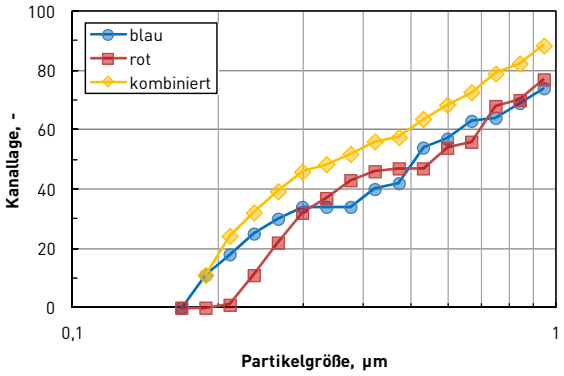
Specifications

Two long-life laser diodes of different wavelengths are located in the measuring cell and illuminate the particles flowing by. The resulting scattered light is collected by a photo detector. The optical signals are converted into electrical signals and processed by a microprocessor. The microprocessor amplifies the signals, determines their pulse height and classifies them into the appropriate pulse height classes. The channel contents (more than 90 size channels are available) are transmitted to a computer via the serial interface. Using the software PASWin with the provided calibration function, particle sizes can be assigned to the class boundaries resulting in the particle size distribution.

Details

Advantage of the dual wavelength technology

In the following figure the advantage of using two lasers with different wavelengths is shown using DEHS as an example.



Assignment of channel position to particle size depending on the wavelength used (blue 450 nm, red 660 nm, combined)).

If monochromatic light, i.e. light of one wavelength, is used for scattered light generation, there is a discontinuity in the graph of signal-channel-to-particle-size in the range of the wavelength used (see example in the diagram above; red or blue curve). A discontinuity means that particles whose size falls within this range are difficult to distinguish from one another. The use of two light sources with monochromatic light of different wavelengths for scattered light generation has the advantage that the described discontinuities are compensated.

Thanks to the optimized graph, the particle signals are more distinct, resulting in better size classification accuracy and higher size resolution.

Further options

Besides number-based information, the LAP 323 can also be used to determine the mass concentration in the feed aerosol. More than 95% of the sample volume flow is directed through the easily accessible bypass filter, which removes all particles present. Weighing the filter thus provides information about the mass per time unit.

Accessories

- Carry case
- Sample Switching Unit SYS 520
- Software PASWin (included in delivery)
- Dilution System DIL

Technical specifications

particle size	0,15 – 40 µm
particle concentration	< 10^4 cm^{-3}
size resolution	max. 128 (64) size channels or user defined
Volume flow rate	3,0 l/min (total) 0,1 l/min (measuring zone)
light source	Laser diode - red: 660 nm, 30 mW - blue: 450 nm, 60 mW
serial port	RS 232
power supply	110 - 230 VAC, 50-60 Hz; 12 VDC, 4,2 A
dimensions (w x h x d)	220 × 380 × 200 mm
weight	9,4 kg
normative references	VDI 3867-4:2020 (E) ISO 21501-1:2009

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