WELAS® DIGITAL 2000

The welas® digital 2000 is a flexible, powerful, and economical light-scattering spectrometer system that determines particle concentration and size precisely and reliably.

Unique are up to four measuring ranges in only one device:

- 0.2 μm – 10 μm
- 0.3 μm – 17 μm
- 0.6 μm – 40 μm
- 2 μm – 100 μm (additionally for sensors 2300 and 2500)

welas® digital 2000 is famous for up to 128 size channels per measuring range and a concentration range from < 1 particle/cm^3 to 10^6 particles/cm^3.

MODEL VARIATIONS

welas® digital 2000 H

With heating regulation up to 250 °C for welas® aerosol sensors

welas® digital 2000 HP

With automatic regulation of the sampling flow through the welas® aerosol sensors at an overpressure up to 10 bar or in temperatures up to 120 °C

welas® digital 2000 P

With automatic regulation of the sampling flow through the welas® aerosol sensors at an overpressure up to 10 bar

OPERATION PRINCIPLE

AEROSOL SPECTROMETER WITH LIGHT WAVE CONDUCTOR TECHNOLOGY

The device is characterized by its optical fiber technology, too. The welas® sensor is connected via a fiber optic cable of up to 30 m with the welas® digital control unit.

This minimizes particle losses in long sampling lines by simply installing the sensor directly at the sampling location.

Connection via fiber-optic cable allows the welas® 2000 and 2000 P series sensors to be easily connected to the control and evaluation unit and interchanged as required.

The welas ® sensors[1] are equipped with different-sized measurement volumes. This allows adaptation of the measuring device to the particle concentration in the application, such that a high counting rate can be achieved with a short measuring time.

The aerosol sensors allow reliable measurement in the concentration range from < 1 particle/cm^3 to 10^6 particles/cm^3.

The welas® digital is based on scattered-light analysis on a single particle. In the welas® digital, the special advantages of the well-known and internationally acclaimed welas® system are combined with new and fast digital individual signal processing, and coincidence correction is enabled.

The high size classification accuracy and the high size resolution are guaranteed by the following special feature (see Graph 1):

- White light and 90° light-scattering detection ⇒ Unambiguous calibration curve
- Patented T-aperture ⇒ No border zone error
- New digital individual signal processing ⇒ Coincidence detection and correction of the individual signal making it possible to measure in higher concentrations.

welas® digital offers a fast signal processing processor, which analyses the progression of each particle signal. This makes it possible to recognize coincidental events in light scattering measurement technology at the individual signal and correct them (according to Dr. Umhauer / Prof. Dr. Sachweh).

This way, it is possible to increase the maximum concentration limit up to 10^6 particles/cm^3 (welas® 2070 sensor).

Also, low concentrations of < 1 particle/cm3 with the welas® 2500 sensor lead with the welas® 2500 sensor lead to higher measuring accuracy.

High classification accuracy, high-resolution capability, and a high counting efficiency are the prerequisites for unambiguous particle measurement.

[1] welas® sensors: http://www.palas.de//product/aerosolsensorswelas2000

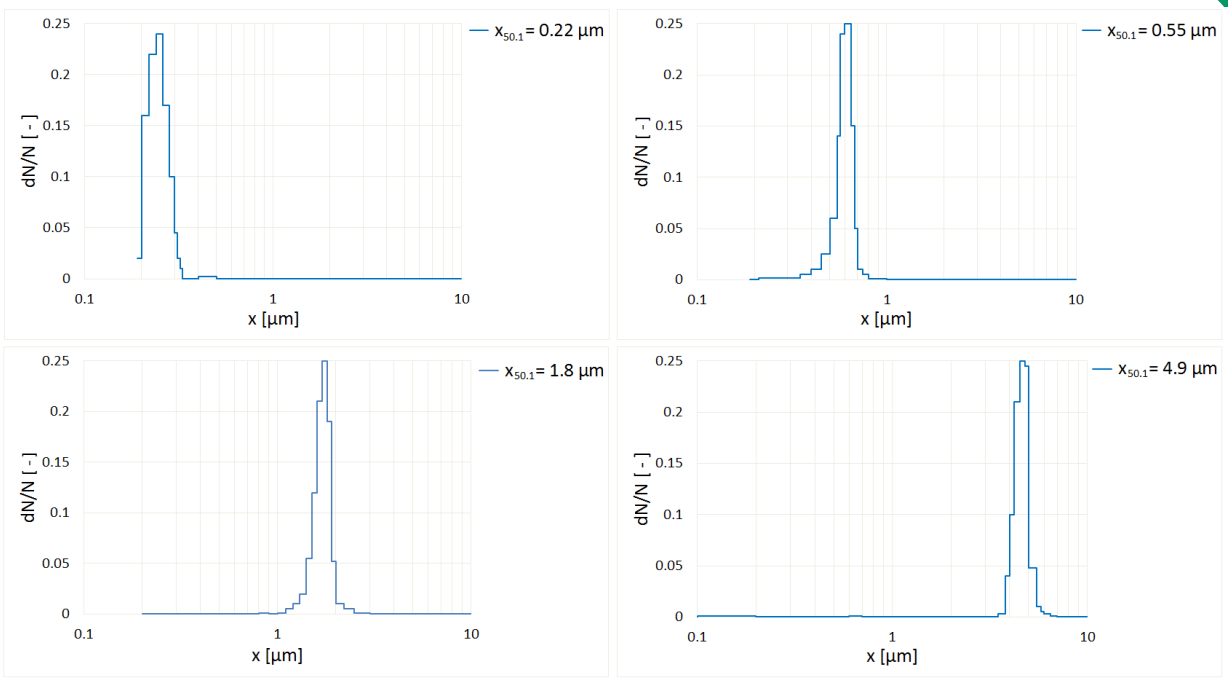

Fig. 1: Resolution capability and classification accuracy

The welas® digital is characterized by its high counting efficiency starting from 0.2 µm!

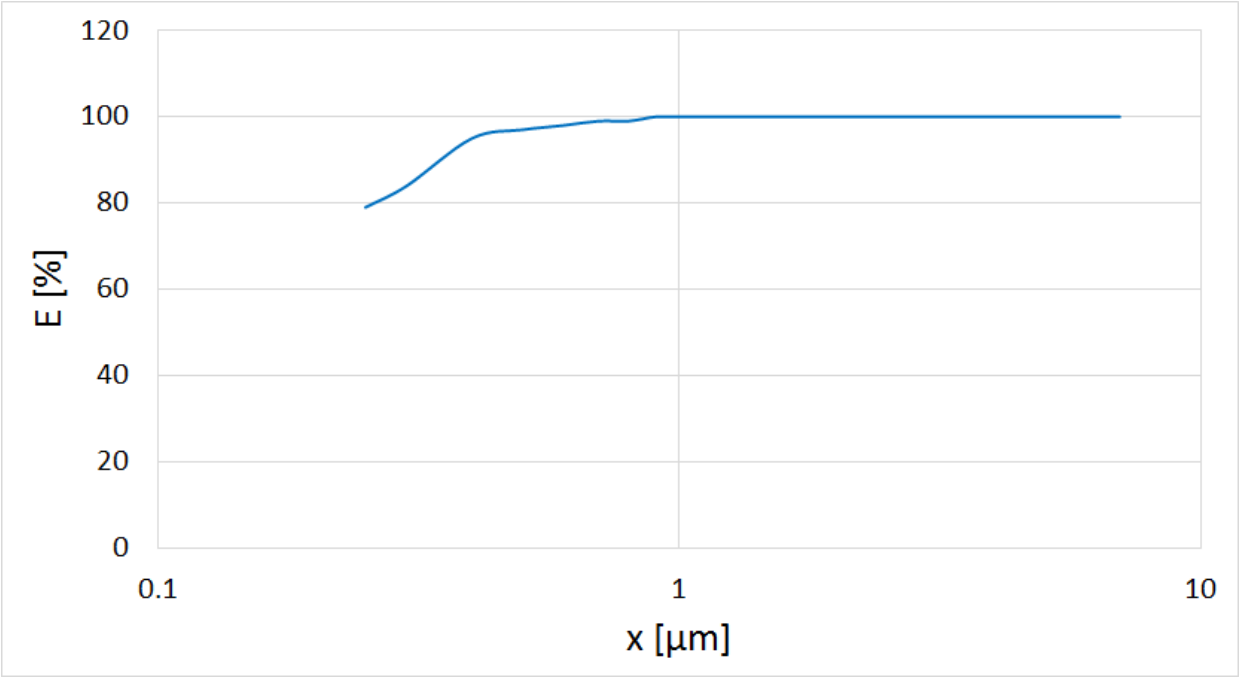

Fig. 2: Example with 2200 sensor, in relation to LAS-X II

Extensions/Accessories

The welas® digital is controlled via a laptop using the PDControl software. The software allows particle measurements and calibration of the measurement device. In addition, the measurements can be analyzed and compared in detail with a temporal resolution down to 10 ms.

Benefits

- Measuring range of 0.2 to 100 μm (4 measuring ranges selectable in one device)
- Up to four measuring ranges in only one device:
  - 0,2 μm – 10 μm
  - 0,3 μm – 17 μm
  - 0,6 μm – 40 μm
  - 2 μm – 100 μm (additionally for sensors 2300 and 2500)
- Up to 128 size channels per measuring range
- Concentration range of 1 particle/cm^3 to 10^6 particles/cm^3
- Calibration curves for different refractive indices
- Very high and reproducible counting efficiency rate starting at 0.2 μm (see Graph 2)
- High temporal resolution down to 10 ms
- Optical fiber technology
- Measurement in a potentially explosive environment
- Long service life of the light source of 2000 h
- Extensive PDControl and FTControl software
- Simple operation
- Calibration, cleaning, and lamp replacement can all be performed independently by the customer
- Low maintenance
- Reliable function
- Reduces your operating expenses

DATASHEET

Measuring principle	Optical light-scattering
Measurement range (number C_N)	$< 1 \cdot 10^6$ Partikel/cm^3
Measurement range (size)	0.2 – 10 μm, 0.3 – 17 μm, 0.6 – 40 μm, 2 – 100 μm
Volume flow	5 l/min
Size channels	Max. 64/decade
Interfaces	USB
User interface	Laptop
Software	PDControl, FTControl
Data acquisition	Digital, 20 MHz processor, 256 raw data channels
Light source	Xenon arc lamp 35 W
Housing	Table housing, optional: with mounting brackets for rack-mounting
Installation conditions	+5 – +40 °C (control unit)
Dimensions	185 • 450 • 315 mm (H • W • D) (19″)
Weight	Control unit: approx. 18 kg, sensor: approx. 2.8 kg

Applications

- Separation efficiency determination of automotive cabin air filters, engine air filters, ambient air filters, compressed air filters, vacuum cleaner filters, cleanable filters, electrostatic precipitators, oil separators, cooling lubricant separators, wet separators, cyclones, and other separators
- Isothermal and isobaric particle size and quantity determination, e.g., in the automotive, chemical, pharmaceutical, and food industries
- Investigation of fast, transient processes
- Test of smoke detectors
- Particle measurement for cloud formation
- Emission measurements
- Breathing function: inhalate / exhalate (particle size and number)

Mehr Informationen:
https://www.palas.de/product/welasdigital2000