Product data sheet

Palas® welas® digital 1000

Applications

- Determination of the separation efficiency of car interior filters, engine air filters, room air filters, compressed air filters, vacuum cleaner filters, cleanable filters, electrostatic precipitators, oil separators, cooling lubricant separators, wet scrubbers, cyclones and other separators
- Isothermal and isobaric particle size and quantitative determination, for instance in the automobile, chemical, pharmaceutical and food industries
- Analysis of fast, transient processes
- Inspection of smoke detectors
- Particle formation for cloud formation
- Emission measurements
- Immission measurements

ParteQ GmbH Brunnenstraße 12· D-76316 Malsch · Germany · www.parteq.net
Phone: +49 7204 9474747· E-mail: info@parteq.net

Benefits

- Measuring range of 120 nm to 40 µm (3 measuring ranges selectable in one device)
- Up to four measuring ranges in only one device:
  - 0.12 µm – 3.5 µm (additionally in welas® 1000 and Promo® 1000)
  - 0.2 µm – 10 µm
  - 0.3 µm – 17 µm
  - 0.6 µm – 40 µm
- Up to 128 size channels per measuring range
- Concentration range from < 1 particle/cm³ to 5 • 105 particles/cm³
- Calibration curves for different refractive indices
- Very high and reproducible counting efficiency rate starting at 0.12 µm
- High temporal resolution down to 10 ms
- Extensive PDControl and FTControl software
- Strong, powerful external suction pump ASP 1000
- Calibration, cleaning and lamp replacement can all be performed independently by the customer
- Simple operation
- Low maintenance
- Reliable function

ParteQ

Description

The welas® digital 1000 is a flexible, powerful and economical light-scattering spectrometer system, which determines particle concentration and size precisely and reliably.

With the welas® digital 1000, particle sizes above 120 nm can be reliably measured, as the special high power xenon high pressure lamp with very high light intensity and the photomultiplier are directly integrated in the aerosol sensor.

For this reason, the welas® digital 1000 has an especially high resolution capability and an especially high classification accuracy, which is why it is used as a reference device for other measurement methods.

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

- 0.12 µm – 3.5 µm (additionally in welas® 1000 and Promo® 1000)
- 0.2 µm – 10 µm
- 0.3 µm – 17 µm
- 0.6 µm – 40 µm.

welas® digital 1000 is famous for up to 128 size channels per measuring range and a concentration range from < 1 particle/cm^3 to 5 • 10^5 particles/cm^3.

The welas® digital is based on scattered-light analysis on a single particle. In the welas® digital 1000, the special advantages of the well-known and internationally acclaimed welas® system are combined with new and fast digital individual signal processing. This allows a digital analysis of each individual signal with coincidence detection.

The best size classification accuracy and the best size resolution are guaranteed by the following special feature:

- 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

The sensors are optionally available for measurements in overpressure up to 10 barg and at high temperature up to 250 °C (higher on request).

The welas® digital measurement technology

welas® digital offers a new, fast 20 MHz signal processing processor, which analyses the progression of each particle signal.

This makes it possible to recognise coincidental events in light scattering measurement technology at the individual signal and correct them (according to Dr. Umhauer / Prof. Dr. Sachweh). This makes it possible to increase the maximum concentration limit up to 5 • 10^5 particles/cm^3, too.

Furthermore, the new signal detection electronics, which include a new, powerful

logarithmic A/D converter, allow particles of 120 nm to be measured with more than 50 % counting efficiency.

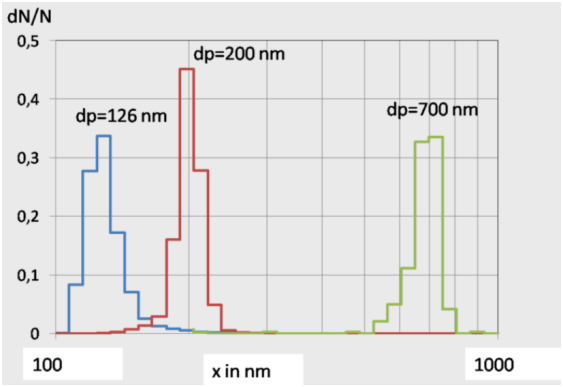

Fig. 1: Resolution capability and classification accuracy

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

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

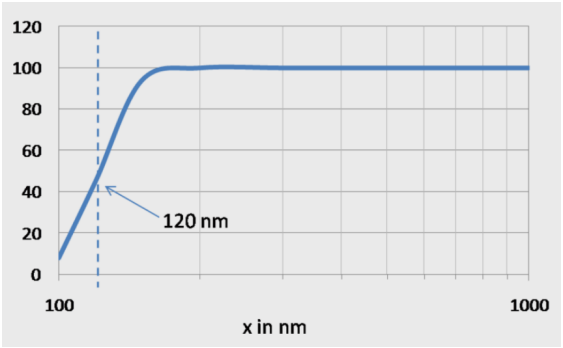

Fig. 2: Counting efficiency with the welas® 1200 sensor

The welas® digital 1000 sensors

The welas® 1100 and 1200 aerosol sensors are characterized by the fact that a powerful light source and the photomultiplier are directly integrated in the sensor. This technology offers the best size resolution, the best classification accuracy and a very low detection limit.

The size of measurement volume is crucial for coincidence-free particle size and particle number measurement.

With measurements in coincidence, the diameter is measured too large and the number too small.

Theoretically, for a coincidence-free measurement, i.e. maximum one particle in the measuring volume, at a number concentration of 10^3 particles/cm^3 the measurement volume extension must not be higher than 1 mm^3 .

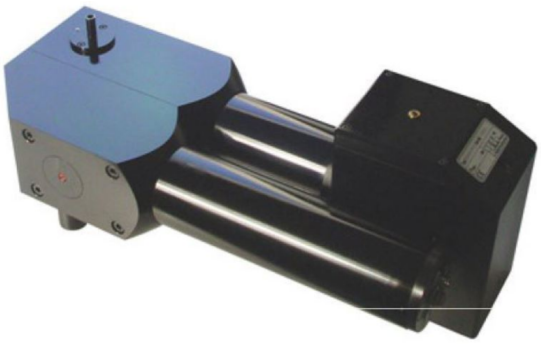

Fig. 3: Aerosol Sensor welas® 1100

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Specifications

Interfaces	USB, ethernet, RS232/485, Wi-Fi
Measurement range (size)	0.12 µm – 3.5 µm, 0.2 µm – 10 µm, 0.3 µm – 17 µm, 0.6 µm – 40 µm
Size channels	Up to 64/decade
Measuring principle	Optical light-scattering
Measurement range (number concentration)	< 5 • 105 particles/cm³
Time resolution	≥ 10 ms
Thermodynamic conditions	10 – 40 °C, -100 – 50 mbarg
Volume flow	5 l/min, 1.6 l/min
Data acquisition	20 MHz processor, 256 raw data channels, digital
Light source	Xenon high-pressure lamp 75 W
User interface	Laptop
Power supply	115 – 230 V, 50 – 60 Hz
Housing	Table housing, optionally with mounting brackets for rack-mounting
Dimensions	185 • 450 • 315 mm (H • W • D) (19" compatible)
Software	PDControl, FTControl

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