PROMO® 1000

Promo® 1000 is a light-scattering aerosol spectrometer system for particle size analysis and concentration determination that can be equipped with all welas® 1100 and 1200 sensors. These sensors allow reliable measurement in the concentration range from < 1 particle/cm^3 - 5 • 10^5 particles/cm^3. With Promo® 1000, particle sizes above 120 nm can be reliably measured, as the unique high-power xenon high-pressure lamp with very high light intensity and the photomultiplier are directly integrated into the aerosol sensor.

Promo® 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.

MODEL VARIATIONS

Promo® 1000 H

Version with heating regulation up to 120 °C for welas® aerosol sensors

Promo® 1000 HP

Version with automatic control of the sampling volume flow by the welas® aerosol sensors under overpressure of 2 to 10 bar or at temperatures up to 120 °C

Promo® 1000 P

With automatic control of the sampling volume flow by the welas® aerosol sensors under overpressure of 2 to 10 bar

OPERATION PRINCIPLE

SCATTERED-LIGHT AEROSOL SPECTROMETER SYSTEM FOR PARTICLE MEASUREMENT FROM 120 NM

A touch display ensures user-friendly operation. Measurements can be started quickly, and all data, such as the current number distribution and the number concentration, as well as 24 further statistical values, can be evaluated and displayed in real-time. All incoming data can be stored with a max. the temporal resolution of 1 s. For data transfer, Promo® can also be integrated into a company network.

Promo®has a standard interface and can be controlled by a process control system or a simple Labview program. The Promo® measurement technology:

Promo® has a new, fast 20 MHz signal processing processor, which analyses the progression of each particle signal.

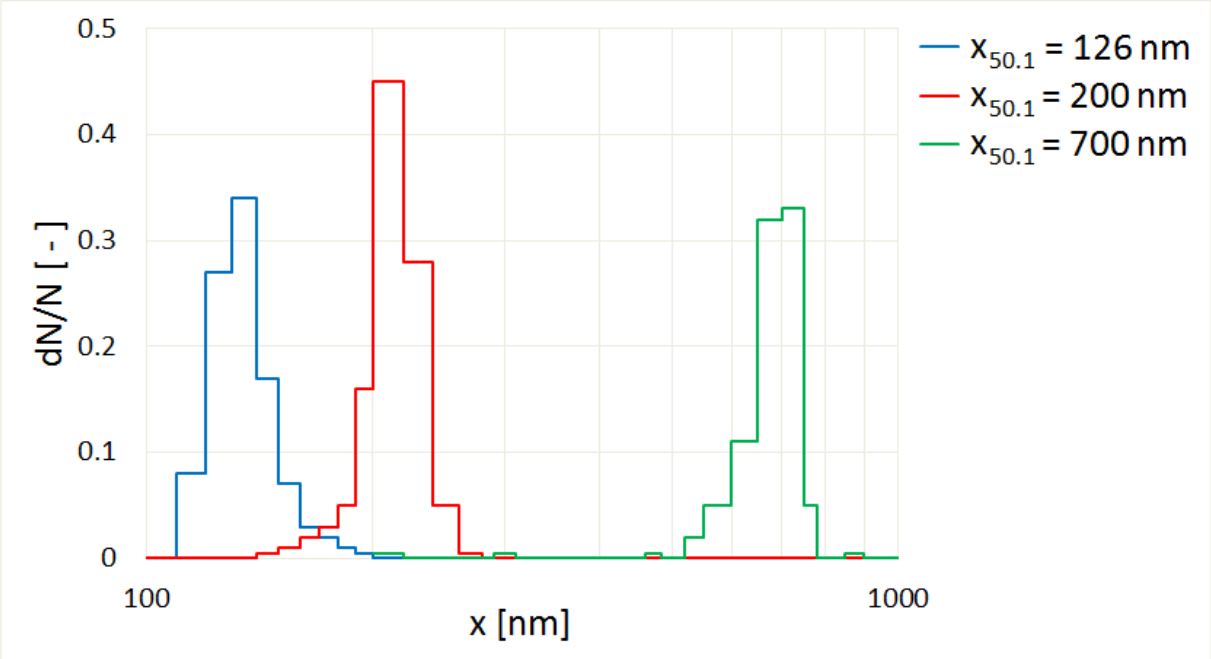
This makes it possible to recognize coincidental events in light scattering measurement technology at the individual signal and correct them (according to Dr. Umhauer / Prof. Dr. Sachweh). This way, increasing the maximum concentration limit to 5 • 105 particles/cm3 is possible^{5} particles/cm^{3}.

Furthermore, the new signal detection electronics, which include a new, powerful logarithmic A/D converter, allow particles of 120 nm to be measured with a 50 % counting efficiency.

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

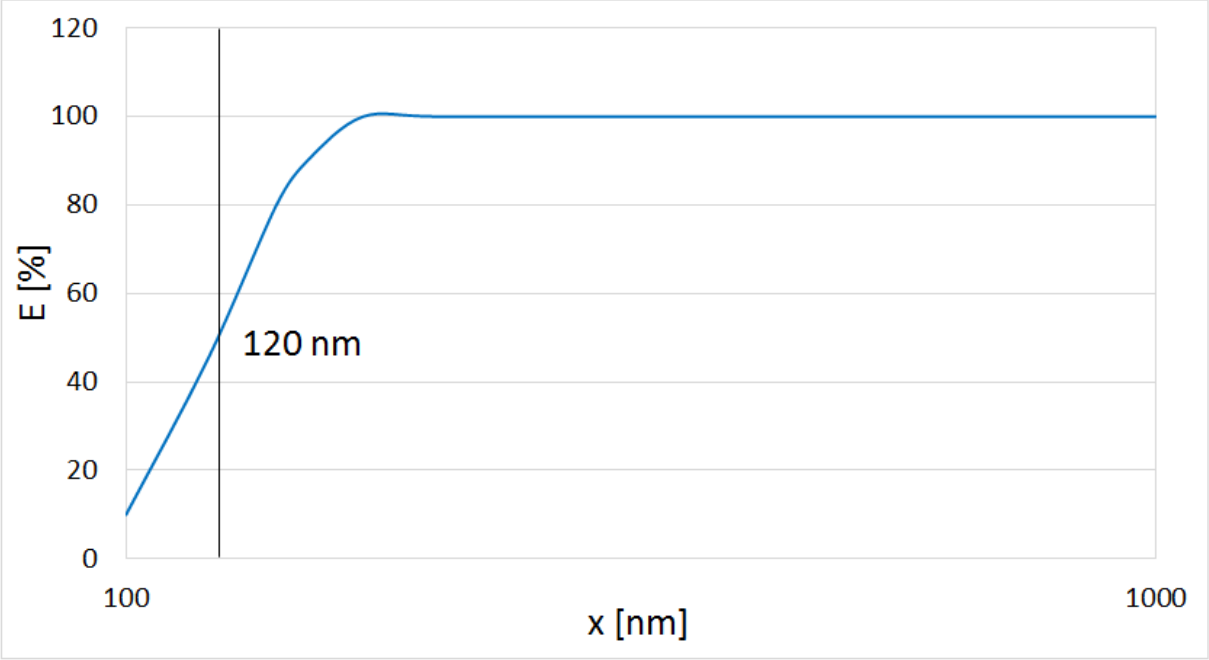
The best size classification accuracy and the best size resolution are guaranteed by the following special features (see Graph 1):

- 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 higher concentrations



Graph 1: Resolution capability and classification accuracy (1200 sensor)

The Promo® is characterized by its high counting efficiency starting from 0.12 µm!



Graph 2: Counting efficiency with the welas® 1200 sensor

Extensions/Accessories

The Promo® 1000 sensors:

A powerful light source characterizes the welas®1100 and 1200 aerosol sensors welas ® 1100 and 1200 aerosol sensors[1] are characterized by a powerful light source, and the photomultiplier are directly integrated into the sensor. This technology offers the best size resolution, classification accuracy, and a low detection limit.

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

[1] welas® 1100 and 1200 sensors: https://www.palas.de//product/aerosolsensorswelas1000

Benefits

- Very high size resolution
- Concentration range from < 1 particle/cm^3 to 5 • 10^5 particles/cm^3
- Calibration curves for different refractive indices
- Very high and reproducible counting efficiency even from 0.12 μm
- High temporal resolution of up to 10 ms
- PDAnalyze analysis software
- Calibration, cleaning, and lamp replacement can be performed independently by the customer
- External control via RS 232 or Ethernet
- Low maintenance, reduces operating costs

DATASHEET

Measuring principle	Optical light-scattering
Measurement range (number C_N)	$< 5 \cdot 10^5$ particles/cm^3
Measurement range (size)	0.12 – 3.5 μm, 0.2 – 10 μm, 0.3 – 17 μm, 0.6 – 40 μm
Volume flow	5 l/min, 1.6 l/min
Size channels	Max. 128 (64/decade)
Time resolution	1 s
Interfaces	USB, Ethernet (LAN), Wi-Fi, RS-232/485
User interface	Touchscreen, 800 • 480 pixel, 7″ (17.78 cm)
Data logger storage	4 GB Compact Flash
Software	PDControl, FTControl, PDAnalyze
Thermodynamic conditions	+10 – +40 °C, -100 – 50 mbar
Data acquisition	Digital, 20 MHz processor, 256 raw data channels
Light source	Xenon high pressure lamp 75 W
Gehäuse	Table housing, optional: with mounting brackets for rack-mounting
Support options	Direct remote access, Palas webserver service
Operating system	Windows embedded
Power supply	115 – 230 V, 50/60 Hz
Power consumption	100 W
Installation conditions	+5 – +40 °C (control unit)
Dimensions	185 • 450 • 315 mm (H • W • D) (19″)
Weight	Control unit: approx. 8 kg, sensor: approx. 18 kg

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

Mehr Informationen:
https://www.palas.de/product/promo1000