AEROSOL SENSOR WELAS® 2100



The model 2100 aerosol sensors are equipped with a small measurement volume and are used for coincidence-free measurement with a maximum number concentrations of up to 500,000 particles/cm^3. Measuring range: 0.2 – 10 μm / 0.3 – 17 μm / 0.6 – 40 μm.

MODEL VARIATIONS



Aerosol sensor welas® 2100 H
Pressure-resistant version up to 1 bar overpressure and heatable up to 250 °C



Aerosol sensor welas® 2100 HP
Pressure-resistant version up to 10 bar overpressure and heatable up to 120 °C



Aerosol sensor welas® 2100 P
Pressure-resistant version up to 10 barg overpressure

OPERATION PRINCIPLE

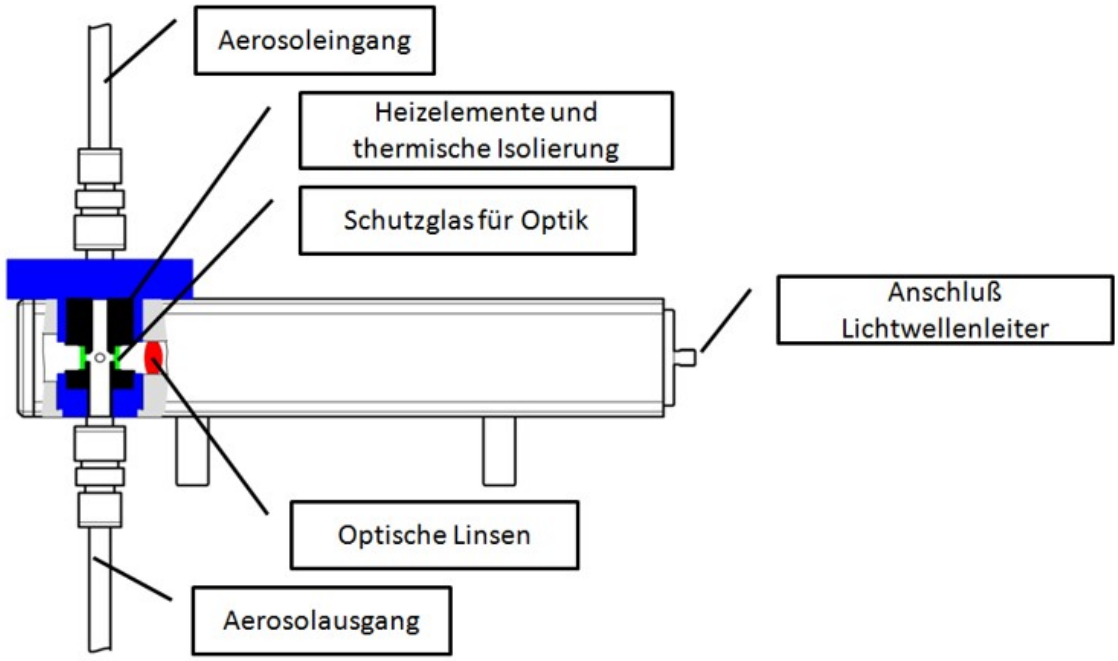
AEROSOL SENSOR FOR NUMBER CONCENTRATIONS UP TO 500,000 PARTICLES/CM^3

welas® digital and Promo® systems are based on scattered-light analysis on a single particle. The particles to be measured pass through a T-shaped, optically delineated measuring volume illuminated by a white light source. This generates a scattered-light pulse whose level is a measure of the concentration.

The following special feature guarantees high-size classification accuracy and high-size resolution:

- White light and 90° light-scattering detection→ unambiguous calibration curve
- Patented T-aperture technology for a T-shaped measurement technology→. No border zone error
- New digital individual signal processing for the analysis of the scattered-light pulse→ Coincidence detection and correction, which enables measurement in up to 5 times higher concentrations

Trouble-free and reliable measurement of large particles up to 40 μm in the sensor is guaranteed by the vertical aerosol duct at a high volume flow of 5 l/min and a large sampling tube diameter.

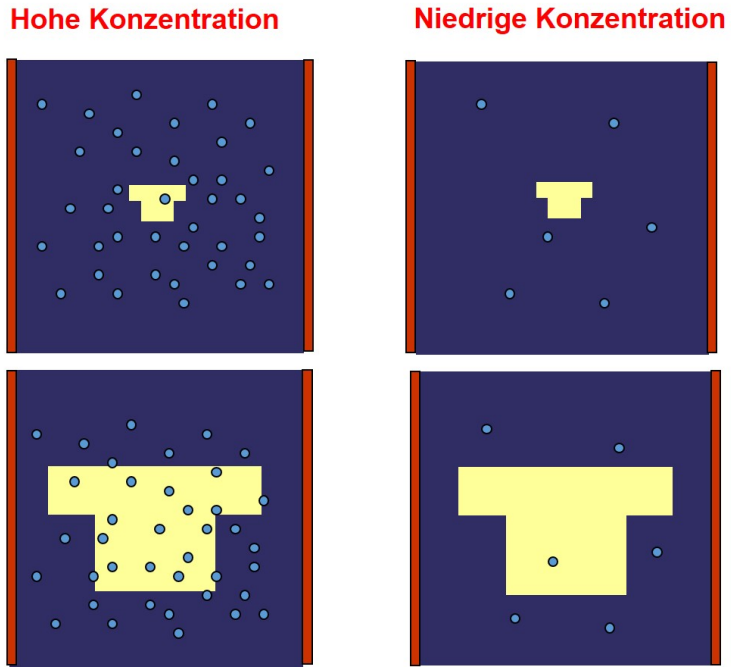


The table below shows the theoretical minimum separation of the particles at a given number concentration. At a number concentration of 10^3 per cm^3, the optical measuring volume must not be larger than 1 mm^3.

Number concentration [P/m³]	Number concentration [P/cm³]	Particle distance [cm]	Particle distance [mm]	Particle distance [μm]
1	10^{-6}	100	1000	
10^3	10^{-3}	10	100	
10^6	1	1	10	
10^9	10^3		1	1000
10^{12}	10^6		0.1	100
10^{15}	10^9		0.01	10
10^{18}	10^{12}		0.001	1

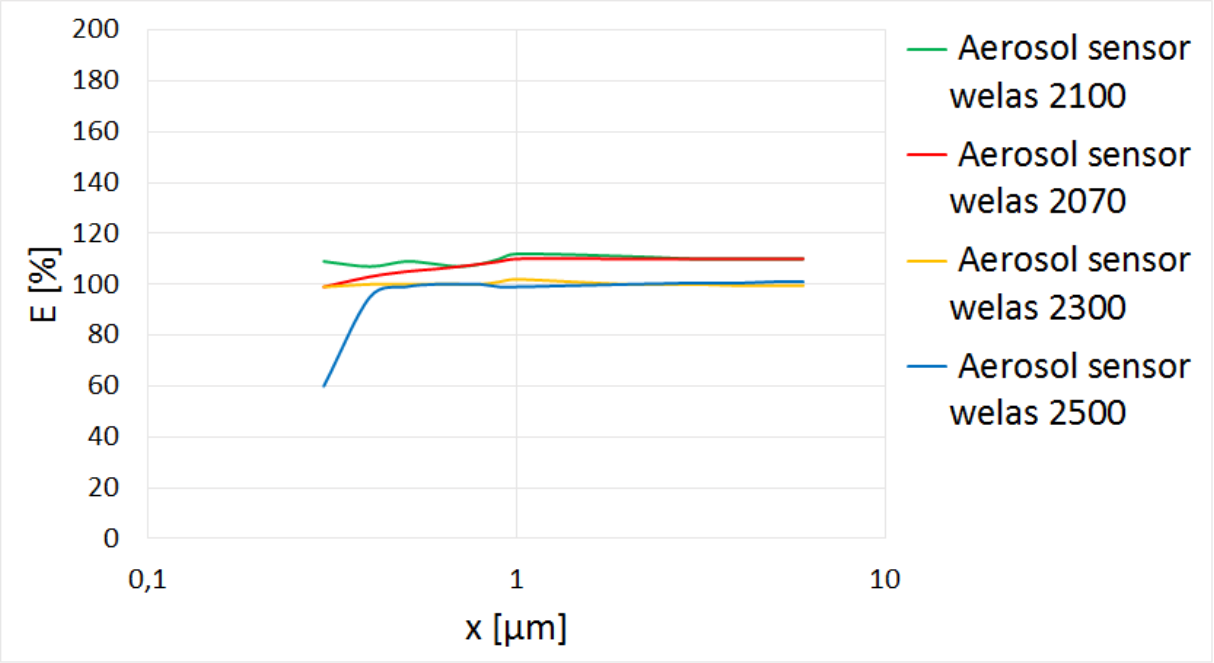
Table 2: welas / number concentration

The customer can select a sensor with the appropriate measuring volume size depending on the concentration to be measured.



For concentrations up to 1,000,000 particles/cm^3, the welas® 2070 sensor with a small measuring volume is used. This ensures the smallest measuring volume such that only one particle ever enters the measuring volume. In low concentrations, the models with a larger measuring volume offer a higher counting rate at the same number concentration.

The welas® sensors are characterized by an excellent agreement of counting efficiency and particle size resolution. This means that the measurement results are highly comparable in terms of the number of concentrations and particle size measured when using different sensors.



Graph 1: Counting efficiency of various sensors in relation to the welas® 2200 sensor (in the measuring range 0.2 – 10 μm)

Extensions/Accessories

Special measuring cuvettes allow the use of the welas® aerosol sensors even under unusual measuring conditions. These are available:

- heatable sensors up to 250 °C; higher temperatures on request
- pressure-resistant sensors up to 10 bar overpressure
- sensor resistant against chemically aggressive media

BENEFITS

- The sensors are easy to replace
- The world's smallest and most robust sensors in the 2000 series
- Very good agreement of all sensors in terms of particle size and concentration
- Minimization of particle losses in long sampling lines by simply installing the sensor directly at the sampling location
- Sensors for in-situ measurements
- Measurement in potentially explosive environments with the 2000 series (without heating)
- Easy to clean
- Simple operation
- Reliable function
- Low maintenance
- Reduces your operating expenses

DATASHEET

Measurement range (number C_N)	0 – 5 • 10^5 particles/cm^3
Measurement range (size)	0.2 – 40 μm (3 measurement ranges)
Volume flow	5 l/min (others on demand)
Thermodynamic conditions	+10 – +40 °C, -100 – +50 mbarg
Light source	Xenon arc lamp 35 W
Dimensions	50 • 250 • 100 mm (H • W • D)
Weight	Approx. 2.8 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/en/product/aerosolsensorwelas2100