

Aerosol sensor welas[®] 2100

Aerosol sensor with optical fibre technology for number concentrations up to 500,000 particles/cm³



Model Variations



Aerosol sensor welas[®] 2100 H

Aerosol sensor pressure-resistant up to 1 bar overpressure and heatable up to 250°C



Aerosol sensor welas[®] 2100 HP

Aerosol sensor pressure-resistant up to 10 bar overpressure and heatable up to 120°C



Aerosol sensor welas[®] 2100 P

Aerosol sensor pressure-resistant up to 10 bar overpressure

Aerosol sensor welas[®] 2100

Description

The model 2100 aerosol sensors are equipped with a small measurement volume and are used for coincidence-free measurement with a maximum number concentrations up to 500,000 particles/cm³.

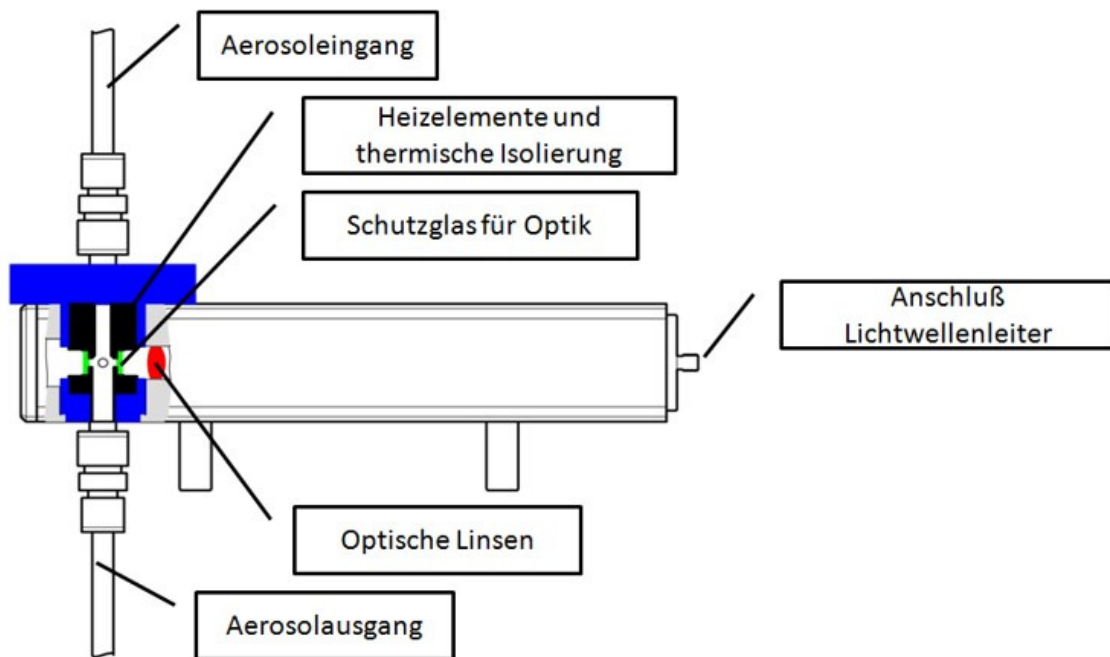
range: 0.2 – 10 µm / 0.3 – 17 µm / 0.6 – 40 µm. **Functional principle:**[®] digital and Promo[®] digital are based on scattered-light analysis on a single particle. The particles to be measured pass through a T-shaped, optically delineated measuring volume that is illuminated by a white light source. This generates a scattered-light pulse whose level is a measure for the concentration.

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

- 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**

Example: the welas[®] sensor aerosol guide heatable up to 250°C (see variations)

-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.

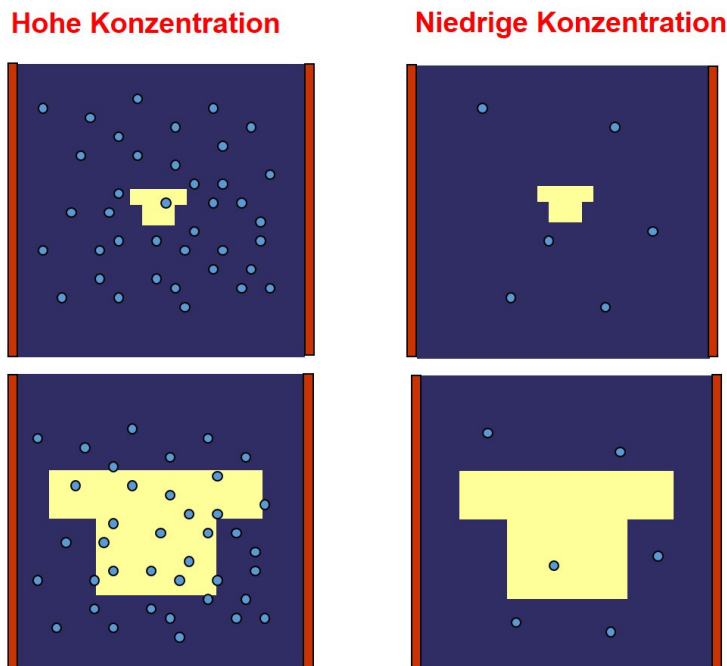


Size limitation of the optical measuring volume

table below shows the theoretical minimum separation of the particles at a given number concentration. a number concentration of 10³ per cm³ the optical measuring volume must not be larger than 1 mm³.

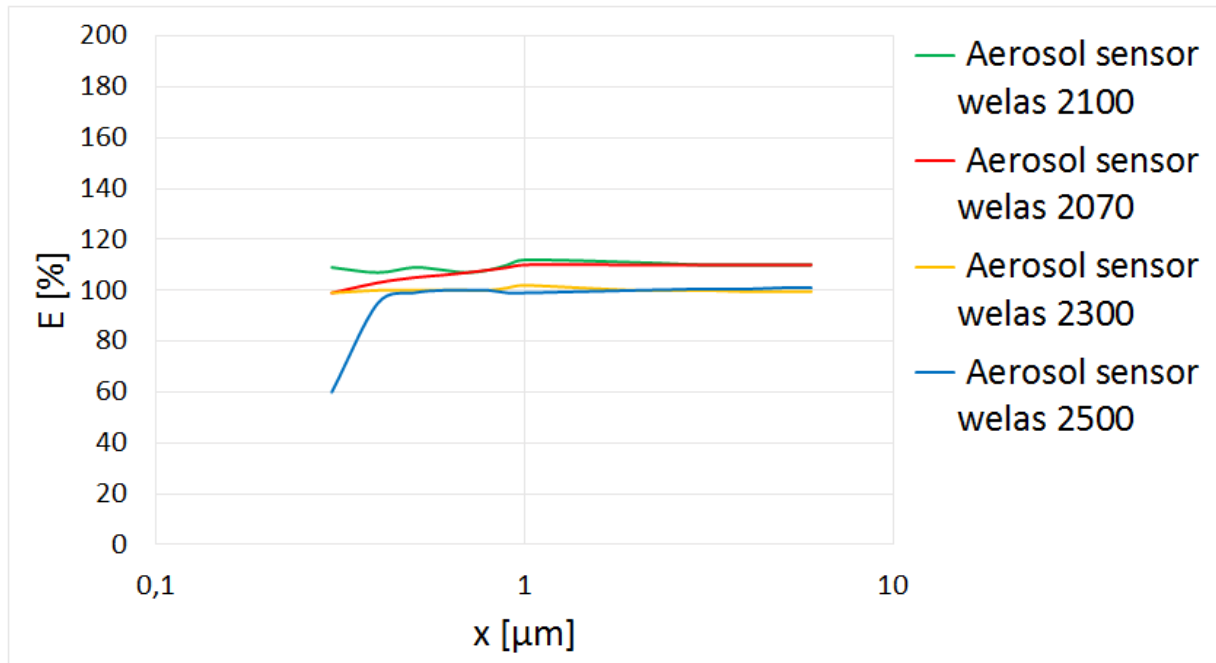
Anzahl-konzentr. [P/m ³]	Anzahl-konzentr. [P/cm ³]	Partikel-abstand [cm]	Partikel-abstand [mm]	Partikel-abstand [μm]
1	10 ⁻⁶	100	1000	
10 ³	10 ⁻³	10	100	
10 ⁶	1	1	10	
10 ⁹	10 ³		1	1000
10 ¹²	10 ⁶		0,1	100
10 ¹⁵	10 ⁹		0,01	10
10 ¹⁸	10 ¹²		0,001	1

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/cm³ 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 offers the advantage of a higher counting rate at the same number concentration. **Agreement of the sensors**welas[®] sensors are characterized by a particularly good agreement of counting efficiency and particle

size resolution. means that the measurement results are highly comparable in terms of the number concentration 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) **Pressure-resistant and heatable aerosol sensors with a special cuvette for the variants P, H and HP** 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

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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 (see Graph 1)
- 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

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Datasheet

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

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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

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