

Aurora™ 3000

3 WAVELENGTH INTEGRATING NEPHELOMETER



Aerosol particles in the atmosphere directly influence the earth's radiative balance by absorbing and scattering the solar radiation and indirectly, by changing the clouds microphysical properties.

The amount of sunlight reaching the earth's surface, rather than being scattered back to space, is an important parameter to accurately model the influence of aerosol scattering on the earth's radiative balance.

The Aurora™ 3000 provides this measurement by reporting both the integrated and back-scattered coefficient.

Using a LED light source, the Aurora™ 3000 simultaneously measures at 525 nm (green), 450 nm (blue) and 635 nm (red) to enable wide and in-depth analysis of the interaction between light and aerosols.

The ECOTECH Aurora™ 3000 includes backscatter measurements that allows both standard integrating measurements of 9 - 170° and also the back scatter 90 - 170°.

APPLICATIONS

- Studies on backscatter and forward scatter
- Scattering enhancement factor (eg. in combination with the ECOTECH ACS)
- Scattering Ångström exponent calculations
- Determination of single scattering albedo.

Analog input:

- High powered LED light source increases measurement accuracy
- Single light source and detector used for all wave-lengths
- Heat generated by the LED light source is a fraction of that generated by a flash lamp, minimising changes in sample RH
- Easy automatic calibration, ensures repeatability of measurement
- Automatic optical reference calibration
- Single light source and detector used for all wavelengths
- Facilitates a wide measuring range (0 to 20,000 Mm⁻¹).

BENEFITS

- Simplified automatic calibration using internal valves, ideal for remote locations
- Fully automatic zero check or adjust, automatic span check or automatic zero and span check available in intervals of 1, 3, 6, 12, 24 hrs or weekly
- Fully integrated package including internal sample pump, sample heater, internal calibration valves, zero air pump and data logger
- Internal sample heater with temperature or RH control, which can be enabled by the user to eliminate the effects of humidity (RH: < 30 to < 90 %)
- 12 VDC operation (60 watts max, 14 watts nominal)
- Holds up to 33 days of 5 minute data averages or 6 days of 1 min data.

LED vs flash lamp

- Our LED light source is guaranteed not to fail within 3 years, and often exceeds 5 years compared to a flash lamp that is recommended to be changed every 4 - 6 months
- LEDs emit light at a specific wavelength eliminating the need for band pass filters
- An LED light source uses the same light path for each wavelength ensuring consistency of measurement, eliminating the need for multiple PMTs and maximising light intensity.

SPECIFICATIONS

Measured parameters:	Light scattering coefficient (σ_{sp}) at (450, 525 and 635 nm) Backscatter coefficient ($b\sigma_{sp}$) at (450, 525 and 635 nm)
Ranges:	0.0 to > 20,000 Mm^{-1}
Lower detectable limit:	< 0.3 Mm^{-1} full and back scatter (60 second averaged data) (0.1 Mm^{-1} optional)
Secondary measurements:	Sample air temperature, RH and pressure. Enclosure temperature
Intensity function:	Full scatter 9 - 170 °C Back scatter 90 - 170 °C, parameterised by Mueller et al, 2010
Flow rate:	≈5 SLPM with default blower. Higher flow can be obtained using the external pump option (e.g. in case of common inlet)
Operating temperature:	- 20 to 45 °C
Operating RH:	10 to 95 %
Calibration:	Span gas available for CO ₂ , SF ₆ , FM-200, R-12, R-22, R-134 or a user defined gas
Optics:	Reference light source measurement
Light source:	Stable LED light source (US patent 7,671,988)
Wavelength:	525 nm (green), 450 nm (blue), 635 nm (red)
Operating voltage:	12 VDC (incl 110 - 240 VAC 50/60 Hz power converter) (14 watts nominal, 45 watts with heater active)
Dimensions:	170 x 700 x 215 mm
Weight:	11.2 kg

COMMUNICATIONS & DATA LOGGING

Outputs:	4 analog outputs (2 voltage & 2 current) and 2 x RS232 serial ports
Filtering:	Kalman (digital adaptive filter), moving average (30 seconds) or no filter
Stored parameters:	Date & Time, σ_{sp} (635, 525 and 450 nm), Air temperature, Enclosure temperature, RH, Pressure instrument status
Capacity:	Maximum of 33 days of 5 minute averages, or 6 days of 1 minute averaged data

LOWER COST OF OWNERSHIP

- Fully automatic zero and span calibrations
- Low power internal 12 V sample heater
- Long lasting low power LED light source
- No bandpass filters to be replaced
- Easy to clean measurement cell.

OPTIONS

- External pump control
- Sample bypass valve used in conjunction with external pump plate kit
- Roof flange kit and rain cap with insect screen
- Gas calibration kit and wall mount bracket.



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