

## THE 'NEXT GENERATION' AETHALOMETER® - MODEL AE33

Life is never just black and white: 7 wavelengths @ 1 Hz



**THE NEW AETHALOMETER MODEL AE33®** offers enhanced performance and features:

- "Full Spectrum" 7-Wavelength operation: UV - IR
- 1 Hz data at 7-Wavelengths
- Real-time DualSpot™ Technology\* compensates for sample spot "loading effects", and provides additional information about aerosol composition
- Dynamic Active Zero built-in diagnostic performance check\*\*
- Network Ready for remote management and data transfer; data stored also locally
- Quick-Clean analytical chamber
- Modular hardware for reliability and servicing
- 19" rack mountable
- Low power consumption

\* Patent applications include EPO EP2151679 , USPTO US2010027013 and others

\*\* European Patent Application No 12158553.3

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# AETHALOMETER® MODEL AE33

## Product specifications

### MEASUREMENT PRINCIPLE

Continuous collection of aerosol deposit on filter, with continuous measurement of the attenuation of transmitted light at wavelengths of 370, 470, 520, 590, 660, 880 and 950 nm.

Measurement of absorption at 880 nm interpreted as concentration of Black Carbon. Simultaneous measurement at multiple wavelengths for studies of aerosol light absorption, atmospheric optics, radiative transfer, emissions testing, and source apportionment.

### DUALSPOT™ TECHNOLOGY

Simultaneous analysis of light absorption by aerosol deposits collected on 2 spots in parallel at different loading rates\*. Mathematical combination of data yields Black Carbon result independent of "spot loading effects".

### SPECIFICITY

No other aerosol species absorbs light in the visible range even 0.001 times as much as Black Carbon.

### SENSITIVITY

Proportional to time-base and sample flow rate settings: approximately 0.03 µg/m<sup>3</sup> @ 1 min, 5 LPM.

### TIME-BASE (USER SETTING)

Selectable from 1 second or 1 minute, resampling to any time resolution possible.

### FLOW RATE (USER SETTING)

Internal pump provides 2 to 5 LPM, monitored by mass flow meter and stabilized by closed-loop control. Higher flow rates possible using optional external pump connected through rear panel.

### SAMPLING

Aerosol sample collected on filter tape. Tape advances automatically when user selectable loading threshold is reached, typically once every few hours depending on concentration and flow rate. Tape advance at predefined hour or interval also possible.

Size segregating inlets (impactor, cyclone) may be attached.

### DATA OUTPUT

Digital data via RS-232, Ethernet, and USB ports

### DATA STORAGE

Data are written to internal memory once every time-base period. Stored data may be transferred to external storage automatically or manually. .

### DISPLAY AND INTERFACE

8.4" color touch-screen with status indicator LED's, remote management via digital interfaces.

### QUALITY CONTROL AND QUALITY ASSURANCE

Automatic or manual sample flow calibration using an externally-attached calibrator. Automatic or manual noise and leakage test using 'Dynamic Active Zero'. Verification of optical performance using a set of standard-traceable neutral density optical filters. Automated tests are programmable to occur at specific time intervals.

### SOURCE APPORTIONMENT

Discrimination of Black Carbon from fossil fuel versus biomass combustion is possible with an on-line application of a two-component model.

### DIMENSIONS

Instrument constructed in fully-enclosed 19" rack mount 6U chassis, hermetically sealed.

### SPECIFICATIONS

**Sample Collection Media:** Teflon-coated glass fiber filter tape

**Internal Vacuum Pump:** dual diaphragm, brushless motor

**LED Optical Source Range:** wavelength 370 – 950 nm

Performance

**Resolution:** 0.001 µg/m<sup>3</sup> or 1 ng/m<sup>3</sup> (user-definable display units)

**Detection Limit (1 hour):** <0.005 µg/m<sup>3</sup>

Range: <0.01 to >100 µg/m<sup>3</sup> Black Carbon

**Measurement Time Base:** 1 second or 1 min (user selectable), resampling to any time resolution possible

**Flow Rate:** 2 – 5 LPM, user selectable, stabilized by closed loop control

Interfaces

**User interface:** 8.4" color touch-screen display

**Communications:** Ethernet, RS232, USB

Electrical

**Power supply:** 100-230VAC, 50/60Hz (auto-switching)

**Power consumption:** 25 W average

Physical Specifications

**Dimensions (HxWxD):** 28 x 43 x 33 cm

**Weight:** 21 kg.

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Specifications are subject to change without notice