Advanced Measurement of Black Carbon

Aethalometer® Model AE33

KEY FEATURES

- Full Spectrum 7-Wavelength analysis: UV – IR, 1 Hz data
- DualSpot™ Technology* for filter "loading effect" compensation
- Real-time source apportionment
- NIST-traceable Calibration / Validation by ND optical kit
- Network ready for remote management and data transfer

*United States Patent 8,411,272, United States Patent 9,018,583, other patents pending

APPLICATIONS

- Air Quality monitoring
- Real-time source apportionment
- Emissions testing
- Climate Change research
- Health Effects research
- Combustion research

MAGEE SCIENTIFIC

Manufactured in Europe by
Aerosol d.o.o., Ljubljana, Slovenia

Product specifications

MEASUREMENT PRINCIPLE

Continuous collection of aerosol on filter with simultaneous measurement of attenuation of transmitted light at wavelengths of 370, 470, 520, 590, 660, 880 and 950 nm.
Black Carbon concentration measurement is defined by the absorption measurement at 880 nm.
Multiple wavelength analysis for source apportionment (identification of biomass smoke), studies of aerosol light absorption, radiative transfer, atmospheric optics.
High data rate capability for source and emissions testing.

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'' and provides additional information about aerosol composition.

*United States Patent 8,411,272, United States Patent 9,018,583, other patents pending

SOURCE APPORTIONMENT

Discrimination of Black Carbon from fossil fuel versus biomass combustion possible with built-in analysis by a two-component model.

SENSITIVITY

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

DETECTION

Detection Limit (1 hour): <0.005 µg/m^3
Range: <0.01 to >100 µg/m^3 Black Carbon
Resolution: 0.001 µg/m^3 or 1 ng/m^3 (user-definable display units)

SAMPLING

Aerosol sample collected on Teflon-coated glass fiber filter tape. Tape advances automatically when user selectable loading threshold is reached, typically once every few hours depending on concentration and flow rate.
Size selective inlets (impactor, cyclone) may be attached.
• Time-base 1 second or 1 minute, post-processing to any time resolution.
• Flow-rate 2 to 5 LPM provided by internal pump. Flow measured by two mass flow sensors and stabilized by closed-loop control.
• Tape advances automatically on aerosol loading or at predefined Times or time intervals.

OPERATOR INTERFACE

Display
8.4'' color touch-screen with status indicator LED's.

Interface
Graphical User Interface with basic data display and control, advanced screens for detailed reporting and parameter setup.

Remote management
Network ready for remote management and data transfer.

DATA OUTPUT & STORAGE

Output
• Digital data via RS-232 COM port and Ethernet

Storage
Data are written to internal memory once every time-base period. Stored data may be transferred over a network or to a manually inserted USB drive.

QUALITY CONTROL AND ASSURANCE

Automatic or manual sample flowrate calibration using an externally-attached calibrator.
Verification of optical performance using a set of NIST-traceable neutral density optical filters.
Automatic or manual "Dynamic Active Zero" and stability tests may be programmed to occur at specified time intervals.

PHYSICAL SPECIFICATIONS

• Dimensions (HxWxD): 28 x 43 x 33 cm
• Weight: 21 kg
• Electrical Power supply: 100-230VAC, 50/60Hz (auto-switching)
• Power consumption: 25 W average
• Internal Vacuum Pump: dual diaphragm, brushless motor
• Modular hardware, constructed in a fully-enclosed 19'' rack mount 6U chassis, hermetically sealed

ACCESSORIES

Neutral Density Optical Filter validation kit (PN 7662)
Ambient meteorological sensor, with 10-m cable (PN 5510)
Aerosol Inlet Dryer including external pump (PN 5610)
PM2.5 inlet (2.5 µm @ 5 LPM) (PN 4110)
PM1 inlet (1 µm @ 5 LPM, 2.5 um @ 2 LPM) (PN 4114)
Mini PM Inlet configurable: PM1, PM2.5, PM4, PM10, TSP (PN 4121)
CO2 sensor, integrated with AE33 airflow & data acquisition (PN 5710)
Flow Calibrator, with cable for automatic/manual use (PN 7900)
Insect Screen Assembly with Water Trap (PN 9556)
Tape Sensor Calibration Disc kit (PN 3410)
Shockproof & waterproof transit case (PN 9610)

Scan the code for more info

GENERAL INQUIRIES:

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