

E-BAM Portable Environmental Beta-Attenuation Mass Monitor

The Met One Instruments' E-BAM is in a class of its own as a portable, real-time beta gauge, which is comparable to U.S. EPA methods for PM_{2.5} and PM₁₀ particulate measurements.

The E-BAM automates particulate measurement by continuously sampling and reporting concentration data. Data records are updated every minute. The E-BAM eliminates the involved process of filter collection and filter weighing of other more expensive, high maintenance instruments. With the adoption of beta attenuation for ambient monitoring the process has become simple, streamlined, and inexpensive.

Real-time accurate, reliable, and repeatable measurement of ambient fine particulate matter has been the elusive goal of environmental regulators and health professionals for many years. Met One Instruments, Inc. has developed advanced particulate monitoring instrumentation which is both reliable and is easy to operate. Results are automatically reported in near real time, eliminating the need for high levels of human intervention. Because sampling occurs under true ambient conditions, semi-volatile organic compounds and nitrates are easily detected thereby avoiding under measurement of particulates. The E-BAM will therefore produce comparable results to the manual reference method.

The E-BAM is a lightweight, portable instrument that operates directly in hostile environments without an exterior enclosure. The robust E-BAM portable sampler system is easily installed in less than 15 minutes. No other sampler matches the portability and flexibility of the E-BAM.



Features:

- Accuracy and precision consistent with U.S. EPA requirements for Class III PM_{2.5} and PM₁₀ measurement.
- Real-time, accurate results without correction factors, regardless of season or geographic location.
- True ambient sampling provides accurate measurement of semi-volatile nitrates and organic compounds.
- Lightweight, rugged construction is easily mounted on a tripod in minutes.
- All-weather construction allows for true ambient sampling.
- Operates on AC or DC power. Battery and Solar options available upon request.

Set up

Quick setup of the E-BAM is assured with a series of prompts instructing the installer on the sequence to follow. Then the E-BAM performs a series of self test diagnostics and alerts the installer of any corrective action. Upon completion, the E-BAM automatically places itself in normal operate mode.

Particulate Size Selection

Size selective concentration measurements are made using a variety of sampling inlets. The E-BAM may be supplied with TSP (Total Suspended Particulate, PM₁₀, PM_{2.5} or PM₁ inlets. Flow dependent cut points in the size selective inlets are maintained using integral flow meter, pressure sensor and ambient temperature sensor.

The PM₁₀ inlet removes particles larger than 10 microns, the inlet is not affected by wind speed and wind direction. For PM_{2.5} or PM₁ secondary size selection is made using a second downstream inlet. The standard configuration of the E-BAM is a self-contained environmentally sealed aluminum enclosure placed on a rugged tripod. This system can be permanently placed on rooftops, near roads, at industrial sites, or rapidly deployed to monitor emergency situations. 'E' represents Environment Proof instrument, E-BAM has been specifically designed to work in hostile environments without additional protection.

Direct Field Reporting

Collecting real time or historical particulate data from a field site has never been easier. Advanced communication options include cellular phone, Line of Sight Radio, and for very remote sites, satellite communications are now available. E-BAM also supports the full line of standard MET ONE options, such as phone modem, and direct communications to a portable computer.

E-BAM data is recorded internally and may be retrieved using one of the communication options, or data may be forwarded to third party data acquisition system. MicroMet Plus Software supports the E-BAM and provides a complete communication, data base and reporting modules with charting. Comet data retrieved software is included.

Digital, Analog and Alarm Outputs

The E-BAM provides both continuous digital and analog outputs. Analog output is selectable to several full-scale voltages. Digital output is supplied as RS-232.

Reporting Modes

The internal data logger can store up over 182 days of concentration data at one hour sample times, and collect data from eight other measurements at the same time! Both digital and analog outputs are included to enable users to connect to other data recording systems.

Easy to Operate

E-BAM has been programmed to operate at all times, except during calibration verification. Current data, historical data, and status information are available at all times without interrupting normal E-BAM operation.

Data Validation

The operator may select various criteria for data validation, including deviation from rolling average, high value excursions, power failure and others. If an error occurs it is entered into the error log with date, time and type of error.



Applications:

- Ambient Monitoring
- Dust Monitoring
- Emission Sampling
- Environmental Surveys
- Fence line Monitoring

Specifications

E-BAM Portable Beta-Attenuation Mass Monitor

Measurement Principle	Particulate Concentration by Beta Attenuation
U.S. EPA Designations	None
Measurement Range	-15 $\mu\text{g}/\text{m}^3$ – 10,000 $\mu\text{g}/\text{m}^3$
Measurement Resolution	1.0 $\mu\text{g}/\text{m}^3$
Sensitivity Standard Deviation	(σ) (1 hour) Less than 3.0 $\mu\text{g}/\text{m}^3$
Lower Detection Limit	(2 σ) (1 hour) Less than 6 $\mu\text{g}/\text{m}^3$ (2 σ) (24 hour) Less than 1.2 $\mu\text{g}/\text{m}^3$
Measurement Sample Time	1 Hour
Flow Rate	16.7 L/min inlet flow rate; actual volumetric flow
Filter Tape	Continuous glass fiber filter; 30 mm x 21 m roll; > 60 days/roll
Span Check	Manual, 800ug (typical), span foil included.
Beta Source	C-14 (carbon-14); 60 μCi \pm 15 μCi (< 2.22 X 10 ⁶ Beq); Half-Life 5730 years
Beta Detector Type Operating	Photomultiplier tube with organic plastic scintillator
Temperature Range Operating	-25° to +50°C.
Humidity Range Inlet	0 – 90% RH, noncondensing
Humidity Control	Actively controlled inlet heater module
User Interface	4.3" graphical touch screen
Ambient Sensor	Model 597A combination AT, RH, and BP serial sensor AT: -50° to +70°C; RH: 0 to 98%; BP: 375 to 825 mmHg
7500 Digital Serial Interface	2 channels, half duplex RS-485
Serial Interface	1 channel; full duplex RS-232, USB (Shared common serial output 1 channel; half duplex RS-485 Baud rates 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Internal Data Storage External	15 Days 1-minute average, 2.6 years 60-minute average
Data Storage Compatible	1 USB Flash drive device
Software	Air Plus 5, Comet™, HyperTerminal®
Power Supply	AC Version: 100 - 230 VAC; 1.4 Amp AC, 50/60 Hz; 102 W, 12 VDC @ 8.5 Amp
Weight	31 lbs. (14.1 kg)
Dimensions (Without Tripod)	Height: 18 in (46 cm) Width: 16 in (41 cm) Depth: 9 in (23 cm)

Specifications are subject to change at any time.



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