Met One Instruments

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BAM 1022

Real-Time Portable Beta Attenuation Mass Monitor

The **BAM 1022** is a real-time portable EPA Class III FEM beta attenuation mass monitor which continuously measures the mass concentration of ambient particulate matter collected onto glass fiber filter tape with time resolution of one-minute.

The **BAM 1022** employs an in-line sampling geometry in which the attenuation of beta rays across filter media is measured and particulate matter is sampled simultaneously. This allows ambient sampling to occur for virtually 60 minutes each hour. It also allows for beta ray measurements to be made for virtually the entire hour thereby improving sensitivity and time resolution.

The **BAM 1022** employs a unique "in-situ" sampling technique where the beta measurement is kept at a near fixed temperature above ambient conditions, thereby minimizing measurement error due to loss of semi-volatile particulate material or due to excessive moisture in the sample stream. The **BAM 1022** has US-EPA designation for $PM_{2.5}$ (EQPM-1013-209).

Applications

The **BAM 1022** is ideal for the following applications:

- Criteria-Grade Air Quality Surveillance Networks
- Near-Roadside PM Monitoring
- Rapid-Deployment Applications
- Academic & Climate Research
- PM Monitoring in Locations Impacted by Smoke from Forest Fires or Controlled Burns

Features

- **Continuous measurement of $PM_{2.5}$ that provides high accuracy, & minimal measurement artifacts**
- **User-friendly touchscreen interface**
- **Integrated weatherproof enclosure**
- **Reduced background determination frequency**
- **Extremely high accuracy and performance, even under high ambient dew point operation**
- **Advanced communications features allowing remote operation & cloud-based communication**
- **Advanced diagnostics**
- **Meteorological & other sensor inputs**

Specifications

Measurement principle:	Beta Attenuation.
US EPA designations:	$PM_{2.5}$ EPA Class III Federal Equivalent Method (EQPM-1013-209).
Measurement range:	O µg/m³ - 10,000 µg/m³.
Accuracy:	Meets US-EPA Requirements for Class III $PM_{2.5}$ FEM.
Measurement resolution:	1.0 µg/m³.
Lower detection limit:	< 4.8 µg/m³ (Hourly, 2σ) / < 1.0 µg/m³ (24 Hour, 2σ).
Sampling time:	Continuous Air Sampling with Hourly Tape Advance.
Measurement cycles:	Primary: Automatic Hourly PM Measurement (Required for $PM_{2.5}$ FEM Operation). Secondary: User Selectable Short-Term Averages (5 to 60 minutes).
Sample flow rate:	16.7 liters/minute.
Flow accuracy:	± 2.0 %.
Filter tape:	Continuous glass fiber filter, 30 mm x 25 m roll. Up to 2 months operation per roll.
Maintenance interval:	8 Weeks (minimum).
Span check:	Manual Audits Performed with Zero and Span Foils (Included).
Beta source:	^{14}C (carbon-14), 60 µCi ±15 µCi (< 2.22 X 106 Beq) Half-Life 5730 years.
Detector type:	Scintillation Photomultiplier Tube.
Operating Temp Range:	-30° to +50° C.
Operating humidity range:	0 to 90% RH, non-condensing.
User interface:	4.3” graphical touch screen.
Analog output:	Two channels; optically isolated; 0-1, 0-2.5, 0-5 VDC.
Alarm contact closure:	1 channel; dry NO contact; 1 A at 125 VAC or 60 VDC maximum.
Serial interfaces:	1 channel; full duplex RS-232, USB serial (Shared common serial output). Baud rates 2400, 4800, 9600, 19200, 38400, 57600, 115200. 1 channel; half duplex RS-485. Baud rates 2400, 4800, 9600, 19200, 38400, 57600, 115200. 1 channel; Ethernet.
Compatible software:	Comet™, Air Plus™, terminal programs such as HyperTerminal®.
Data logger memory:	22,528 records (2.6 years @ 1 record/hr.; 15.6 days @ 1 record/min).
Unit dimensions:	55.9 cm wide x 45.7 cm deep x 139.7cm high (22”w x 18”d x 55”h).
Weight:	38.6 kg (85 lbs) fully assembled.
Power supply:	100-240 VAC 50/60 Hz universal input; 12 VDC, 8.5 A output.
Power consumption:	115 VAC Setup: Approx. 300 W (incl. BAM 1022, Inlet Heater, Pump, & Fans). 230 VAC Setup: Approx. 850 W (incl. BAM 1022, Inlet Heater, Pump, & Fans).
Approvals:	NRC, ISO 9001, ROHS, US-EPA.

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