



## Met One Offers Four BAM Models

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Beta Attenuation Mass Monitors "BAMs" are regarded as the standard for continuous ambient particulate mass measurement in air quality monitoring because of their simplicity, reliability, and unsurpassed accuracy. Almost all large air quality monitoring networks worldwide use BAMs for this reason. In addition, because of their uncompromising accuracy and ease of use BAMs are used in the following applications:

### Beta Attenuation

Beta attenuation is the most widely used method worldwide for regulatory monitoring of particulate matter. Over the past decade BAMS have largely supplanted other methods such as the "TEOM" because they are generally more reliable, less complex, and less expensive to operate.



**E-BAM PLUS**  
PORTABLE BETA GAUGE



**BAM-1020** BETA ATTENUATION  
MASS MONITOR



**BAM-1022** PORTABLE  
CONTINUOUS BETA  
ATTENUATION MASS MONITOR



**E-BAM**  
PORTABLE BETA GAUGE

## Beta Attenuation Mass Monitors

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### BAM 1020

- US-EPA Designated PM10, PM2.5, PM10-2.5
- Certified in China, Korea, EU, Russia
- Rack mounted or bench top
- 3rd generation
- Time-proven technology
- Gravimetrically-traceable calibration
- Cloud modem compatible
- Air quality monitoring networks
- Roadside monitoring



The BAM 1020 beta attenuation mass monitor is the defacto US standard for continuous PM monitoring. It was first introduced in 1995, received EPA designation for PM10 in 1998, EPA designation for PM2.5 in 2008 (almost 2 years ahead of the competition) and EPA designation for PM10-2.5 in 2009. It possesses more than a dozen international certifications including CNEMC (China), TUV (EU), Korea, Taiwan, and Russia.



### BAM 1022

- US-EPA Designated PM2.5
- Lightweight, portable
- Self-contained: no shelter/enclosure necessary
- Simultaneous 1-hour and real-time output
- Time-proven technology
- Gravimetrically-traceable calibration
- Cloud modem compatible
- Air quality monitoring networks
- Roadside monitoring
- Emergency responder applications
- Community monitoring
- Ideal field audit device

The BAM-1022 represents the future of regulatory air quality monitoring. It is self-contained; no shelter or enclosure is required. This relieves the user of having to appropriate the space, the power, the expense, and the hassle of having to set up an environmentally controlled shelter on-site in order to perform a simple PM measurement. Unlike most air quality monitors, which are generally set up and perform their measurements at or near room temperature inside of a shelter or enclosure, the BAM-1022 performs its measurement under near ambient conditions. This approach can improve the accuracy of the measurement.

## Lightweight, Portable

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### E BAM PLUS

- US-EPA Designated PM<sub>10</sub>
- Lightweight, portable
- Self-contained: no shelter/enclosure necessary
- Simultaneous 1-hour and real-time output
- Time-proven technology
- Gravimetrically-traceable calibration
- Cloud modem compatible
- Air quality monitoring networks
- Roadside monitoring
- Emergency responder applications
- Community monitoring
- Ideal field-audit device



### E BAM

- Lightweight, portable
- Easily operated from battery or solar power
- Self-contained: no shelter/enclosure necessary
- Simultaneous 1-hour and real-time output
- Time-proven technology
- Gravimetrically-traceable calibration
- Real-time output: 1-minute time resolution
- Roadside monitoring
- Emergency responder applications
- Community monitoring



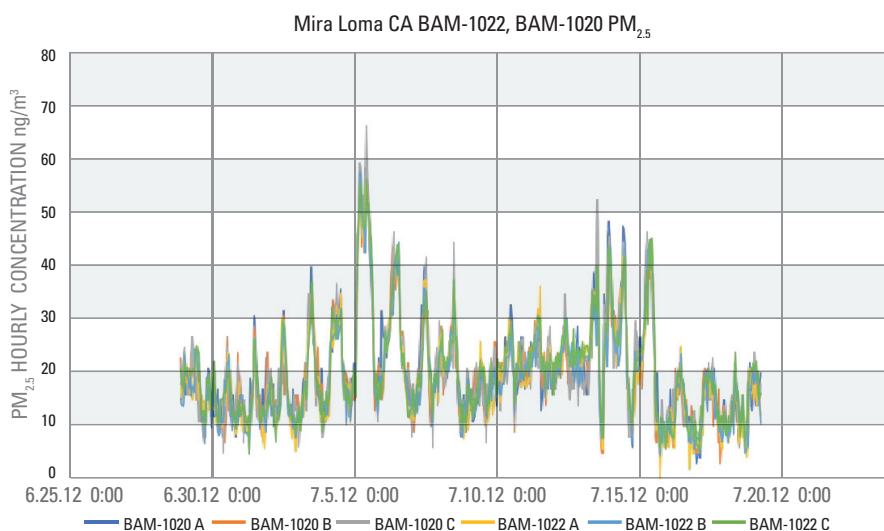
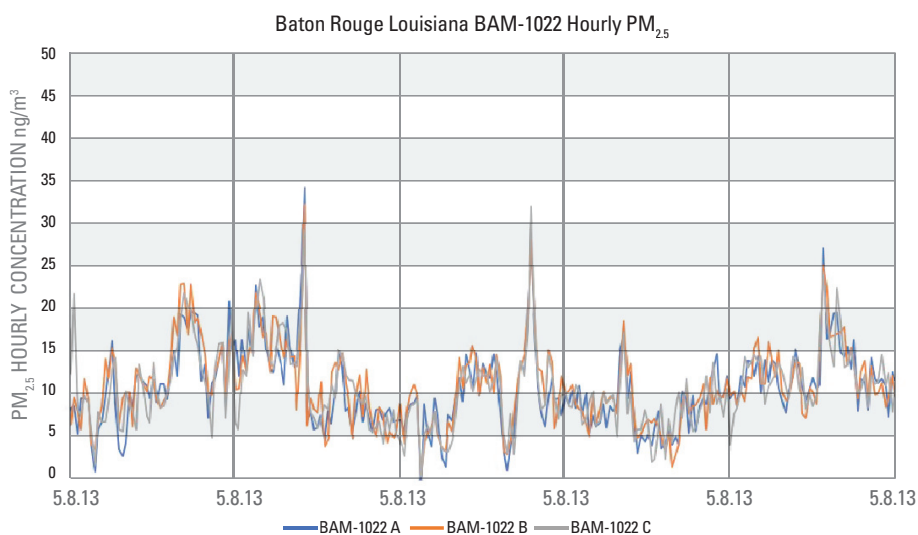
Parameter	BAM-1020	BAM-1022	E-BAM PLUS	E-BAM
Regulatory Designation	US-EPA PM <sub>2.5</sub> Equivalent Method US-EPA PM <sub>10</sub> Equivalent Method US-EPA PM <sub>10-2.5</sub> Equivalent Method TUV, CNEMC Korea, Other International Certifications	US-EPA PM <sub>2.5</sub> Equivalent Method	US-EPA PM <sub>10</sub> Equivalent Method	China Patter Approval
Installation	Rack or Bench Mount	Portable, Self-Contained	Portable, Self-Contained	Portable, Self-Contained
Measurement Cycle	1-Hour	<b>Dual Outputs:</b> 1-Hour, Continuous (1-Minute Minimum Resolution)	<b>Dual Outputs:</b> 1-Hour, Continuous (1-Minute Minimum Resolution)	<b>Dual Outputs:</b> 1-Hour, Continuous (1-Minute Minimum Resolution)
Lower Limit of Detection	4.8 µg/m <sup>3</sup> (1-Hour) 1 µg/m <sup>3</sup> (24-Hour)	4.8 µg/m <sup>3</sup> (1-Hour) 1 µg/m <sup>3</sup> (24-Hour)	4.8 µg/m <sup>3</sup> (1-Hour) 1 µg/m <sup>3</sup> (24-Hour)	6 µg/m <sup>3</sup> (1-Hour) 1.2 µg/m <sup>3</sup> (24-Hour)
Pump Type	AC-Powered Rotary Vane or AC-Powered Reciprocating	AC-Powered Rotary Vane or AC-Powered Reciprocating	AC-Powered Rotary Vane or AC-Powered Reciprocating	DC-Powered Internal Diaphragm
Communications	RS-232, Cellular Modem, Ethernet, USB	RS-232, USB, Ethernet, Cellular Modem, Modbus	RS-232, Cellular Modem, USB, Modbus	RS-232, Cellular Modem, USB, Modbus
Power Requirements	115-240 VAC 5.4 Peak Amps (Shelter Not Included)	100-230 VAC 50/60 Hz, 300 W	100-230 VAC 50/60 Hz 150 W	12VDC AC Power Supply: 100-230 VAC, 50/60 Hz, 102W
Data Storage	182 Days Expandable	22,528 Records (2.6 Years @ 1 Rec./Hour)	1.3 Years @ 60 Minute Average	2.6 Years @ 60 Minute Average

## Unparalleled Accuracy

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### Trustworthy Results

Beta gauges provide unparalleled accuracy in measuring PM worldwide. Beta gauges, unlike other methods such as optical techniques, are sensitive only to PM mass and not to unmeasurable and unknowable factors such as the chemical composition and physical nature of the aerosol being measured. Optical methods for PM measurement are impacted by these factors and since they cannot be known ahead of time, they must make assumptions, which are not always correct. This is especially true during extraordinary events such as wildfires, structure fires, industrial accidents or other instances where there is a heightened need to accurately measure PM concentrations.



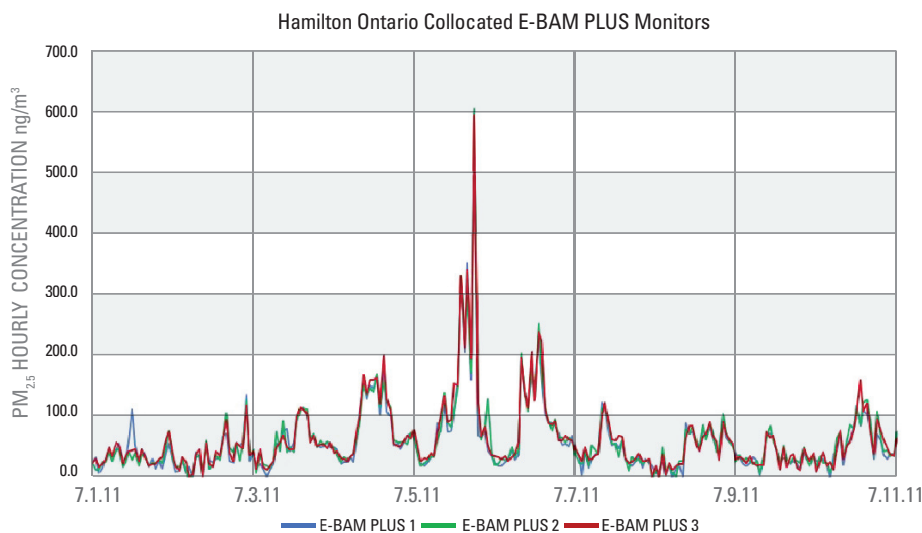
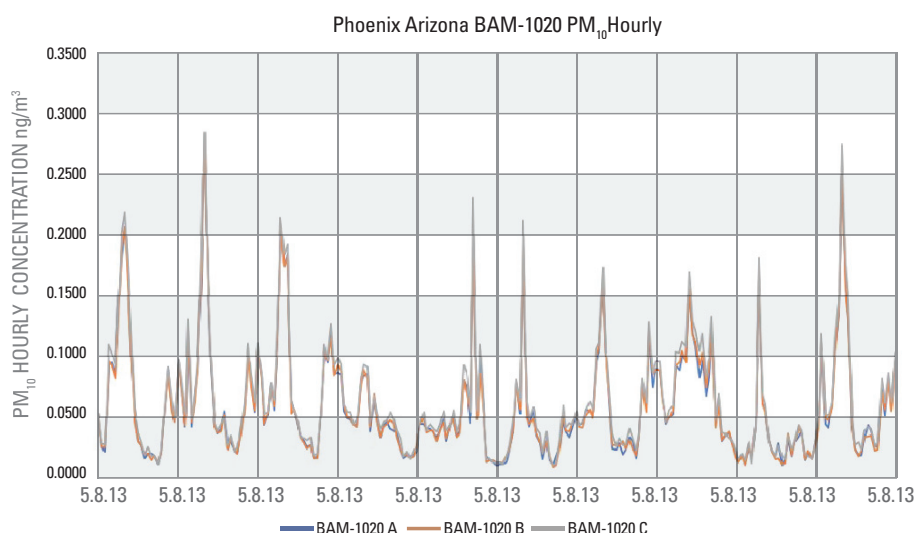


## Reliability and Ease of Operation

BAMs are easy to operate and easy to maintain. The equipment is simple, not overly complex, unlike PM monitors based on the TEOM technology which employ multiple flow splitters, flow controllers, valves and NAFION dryers. The more complex the measurement, the more there is to go wrong.

## Gravimetric Calibration

Our BAMs are calibrated to a gravimetric standard. In other words, when you run one of our BAMs against a reference sampler, such as our E-SEQ-FRM or our E-FRM you can be confident that the results will match. Light-based "spectrometers" can make no such claim as there is direct traceability to mass. Instead, they estimate the chemical aerosol composition of the air and estimate a conversion factor between light signal and particle mass. When the aerosol composition becomes something unexpected, such as might occur during forest fires, industrial accidents or perhaps even when the prevailing wind direction changes, they can be spectacularly wrong – not just slightly off.



## Air Quality Monitoring Networks

The vast majority of PM monitors used in governmental air quality monitoring networks are BAMs. PM monitors used in these networks generally require government certification for PM10 or PM2.5. The BAM-1020, BAM-1022 and E-BAM PLUS monitors are government certified for operation in such networks.



MONITORING NETWORKS

## Emergency Responder Applications

Forest fires, structure fires, or industrial accidents can lead to the release of massive amounts of particulate matter into the air thereby imperiling the health of local residents and emergency responders. Because of the unplanned nature of such events, it is often impossible to set up air quality monitoring equipment in order to accurately assess health threats to the surrounding community. The E-BAM is the only portable beta gauge available that may be easily and economically operated on battery or solar power. If EPA-designated measurements are required, then either the BAM-1022 or the E-BAM PLUS may be quickly and easily deployed.



EMERGENCY RESPONDER APPLICATIONS

## Community and Fence-line Monitoring

Communities in close proximity to stationary emission sources such as petroleum refineries, petrochemical plants, waste incineration facilities, or ports may be subjected to pollutant levels higher than is seen at air quality monitoring stations located in the surrounding areas. A portable carbon monitor could be useful in identifying fugitive emissions and easily identifying local sources of pollution.



COMMUNITY AND FENCE-LINE MONITORING



ROADSIDE MONITORING

## Roadside Monitoring

Often there is an interest in monitoring mobile-source emissions originating from motor vehicle exhaust in close proximity to heavily traveled roadways. For these applications it is generally important to measure only BC which suggests multi-wavelength carbon monitors might not be cost effective. In addition, at such sites often external power is limited thereby making the deployment of air quality monitors requiring an environmental shelter impractical. For these applications, the BC-1060 could track in real-time BC levels in a convenient, cost effective manner.