

BAM-1020 Continuous Particulate Monitor

The BAM-1020 automatically measures and records airborne particulate concentration levels (in milligrams or micrograms per cubic meter) using the industry-proven principle of beta ray attenuation. Thousands of BAM-1020 units are currently deployed worldwide, making the unit one of the most successful air monitoring platforms in the world.



Designations

The Met One Instruments Model BAM-1020 was the first instrument to obtain U.S. EPA Federal Equivalent Method (FEM) designation for continuous PM_{2.5} monitoring, in addition to its longstanding EPA designation for PM₁₀ monitoring. The BAM-1020 has also obtained the corresponding PM_{2.5} and PM₁₀ certifications in the European Union. Two BAM-1020 units can also be operated together as an EPA designated PM_{10-2.5} coarse method. Met One Instruments supplies complete sampling accessory kits for compliance with each designation.

Operation

At the beginning of each sample hour, a small ¹⁴C (carbon-14) element emits a constant source of high-energy electrons (known as beta rays) through a spot of clean filter tape. These beta rays are detected and counted by a sensitive scintillation detector to determine a zero reading. The BAM-1020 then advances this spot of tape to the sample nozzle, where a vacuum pump pulls a measured and controlled amount of outside air through the filter tape, loading it with ambient dust. At the end of the sample hour, this dust spot is placed back between the beta source and the detector, thereby causing an attenuation of the beta ray signal which is used to determine the mass of the particulate matter on the filter tape. This mass is used to calculate the volumetric concentration of particulate matter in ambient air.

Data Collection

All data files are accessible via an industry standard two-way RS-232 serial port using common terminal programs or Met One Instruments software such as Air Plus™ and Comet™. The data is available in a variety of formats including daily reports, last record, all data, and new records since last download. Configuration files, error logs, and flow statistics are also available. Optional Ethernet and USB data collection support is also available.

Error Handling

The BAM-1020 performs continuous user selected evaluation of a variety of criteria for data validation including flow statistics and a comprehensive set of error codes including power failures, flow failures, hardware failures, tape errors, nozzle errors, span check errors, beta count errors, and more.

Maintenance

The BAM-1020 is designed to run continuously with only monthly or bi-monthly scheduled maintenance—a single roll of filter tape will last more than 60 days. The BAM-1020 also contains a comprehensive self-test function which allows the unit to preemptively test itself for any mechanical failures in the tape control system.

Features

- U.S. EPA Equivalent Method for PM10, PM2.5, and PM10-2.5 monitoring
 - Long term unattended remote operation of up to 60 days between site visits
 - Very low operating costs
 - Automatic Span Calibration checks
 - Fast and easy field audits using common FRM audit tools
 - Bench top or equipment rack mounting in mobile or stationary shelters
 - Rugged anodized aluminum, stainless steel, and baked enamel construction
 - Highly accurate, reliable, and mechanically simple flow system
 - Hourly filter advances minimize effects on volatile compounds
 - Advanced Smart Heater technology precisely controls sample relative humidity
 - Integrated datalogger allows the connection of up to six meteorological sensors
 - Data retrieval through RS-232 serial ports using direct PC connections, modems, printers, or digital data collection systems
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Specifications

Sensing Element: Multi-stage solid state thermistor, highly linearized

Time Constant: Less than 10 seconds in still air

Self-Heating: None

Housing: 3/8 in (9.5 mm) OD x 6 in (152.4 mm)

Range: -50°C to +50°C (-58°F to +122°F)

Accuracy: $\pm 0.1^\circ\text{C}$ (0.18°F) throughout range, PSD compliant

Connection: 1 ft pigtails (for use with 076B Radiation Shield)

