acoem

BAM 1020

Particulate Monitor

The BAM 1020 automatically measures and records airborne particulate concentrations using the beta ray attenuation method.

It is designated by the US EPA as Federal Equivalent Method for PM_{10} and $PM_{2.5}$ monitoring.

Designations

- **BAM 1000**
  PM_{10}: FEM (EQPM-0798-122) AS/NZS 3580.9.11:2008
- **BAM 1100:**
  $PM_{2.5}$: Class III FEM, (EQPM-0308-170) AS/NZS 3580.9.12:2013

Features

- Long term unattended remote operation of up to 60 days between site visits
- Concentration units: mg/m^3, $\mu g/m^3$
- Automatic hourly span checks
- Fast and easy field audits using common audit tools
- Rugged anodised aluminium, stainless steel, and baked enamel construction
- Highly accurate, reliable, and mechanically simple flow system
- Hourly filter advances minimise effects on volatile compounds
- Real-time particulate monitoring option
- Advanced Smart Heater technology precisely controls sample relative humidity
- Integrated datalogger allows the connection of up to six additional meteorological sensors with 182 days of data storage.

Operations

The BAM 1020 uses the beta ray attenuation method to measure particulate concentration.

Every 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 instrument automatically advances this spot of tape to the sample nozzle, where a vacuum pump then pulls a measured and controlled amount of dust-laden air through the filter tape, loading it with ambient dust.

At the end of the hour, the dust laden spot is placed back between the beta source and the detector, thereby causing an attenuation of the beta ray signal. This is then used to determine the mass of

particulate matter on the filter tape and volumetric concentration of particulate matter in ambient air.

Measurement data, configuration files, error logs, and flow statistics are stored in its internal data logger and are available via RS232 using common terminal programs and ECOTECH Airodis™ software.

Digital dataloggers may obtain data from the unit using serial port commands or by recording the automatic hourly serial output.

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 such as power, flow, hardware, tape, nozzle, beta count and span check errors.

Specifications

Accuracy:	Exceeds US EPA Class III $PM_{2.5}$ FEM standards for additive and multiplicative bias
Measurement resolution:	0.1 µg/m³
Display Resolution:	1 µg/m³
Detection limit:	(2σ) 1 hr: < 4.8 µg/m³ (3.6 µg/m³ typical) (2σ) 24 hr: < 1.0 µg/m³
Range:	1 mg (1000 µg) default setting. Settable from 0.1 mg to 10 mg
Optional ranges:	Available on request
Measurement cycle time:	1 hour
Flow rate:	16.7 litres/minute adjustable 0 – 20 LPM range actual or standardised flow
Filter tape:	Continuous glass fiber filter tape
Span check:	Automatic 0.800 mg (typical) span foil, verified hourly
Beta source:	14C (carbon – 14), 60 µCi ± 15 µCi (< 2.22 x 106 Beq), half-life 5730 years
Beta detector type:	Photomultiplier tube with organic plastic scintillator
Operating temperature:	0 to + 50 °C
Ambient temperature:	– 40 to + 55 °C (BX – 596 AT sensor) – 30 to + 50 °C (BX – 592) Extended range of sensors available
Ambient humidity:	0 – 90 % RH, noncondensing
Sample humidity control:	Active Smart Heater module, 10 – 99 % RH setpoint
Sampling Head:	Dynamic Heated Sampling head measurement of $PM_{2.5}$ with adjustable temperature 20–70 Deg C
Power supply:	100 – 230 VAC, 50/60 Hz. Factory configured
Power consumption:	110 V: 262 W max with Medo pump and inlet heater running (642 W with Gast pump) 230 V: 312 W max with Medo pump and inlet heater running (717 W with Gast pump)
Dimensions: Weight:	310 x 430 x 400 mm 24.5 kg without external accessories

Communication

User interface

- Menu-driven interface, 8 line 40 character LCD display & keypad

Analog output

- Isolated 0 – 1 VDC output standard
- 0-1 V, 0 – 10 V,2-20 mA 4 – 20 mA, 0 – 16 mA switch selectable

Serial interface

- Multi Drop RS232 two-way serial port for PC or modem communications
- USB Port/TCP/IP, Ethernet

Printer output

- Output only serial port for data or diagnostic output to a PC or serial printer

Telemetry inputs

- Clock reset (voltage or contact closure), telemeter fault (contact closure)

Alarm contact closures

- Data error, tape fault, flow error, power failure, maintenance

Error reporting

- User-configurable available through serial port, display, and relay outputs

Memory

- 4369 records (182 days at 1 record/hr)

Options

RTPM

- Real-time particulate monitor provides one minute measurements

Aurora™ Interface

- Enables interfacing of Spirant™ with Aurora™ 2000 Nephelometer for one minute measurements (requires Aurora™ 2000 Integrating Nephelometer)

Sample inlets

- PM_{10}, $PM_{2.5}$ & TSP available

bsi ISO 9001 Quality Management Systems CERTIFIED ISO 45001 Occupational Health and Safety Management CERTIFIED

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CREATING ENVIRONMENTS OF POSSIBILITY

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