**Critical Criteria PM10/PM2.5 Continuous**

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| --- | --- | --- | --- |
| **Criteria (PM2.5/PM10)** | **2) Frequency** | **3) Acceptable Range** | **Comments** |
| **Data Reporting Period** | Report every hour | A 24-hr period is calculated in AQS if 18 or more valid hours are reported for a day | 40 CFR Part 50 App N sec 3(c) |
| **Average flow rate** | Every 24 hour of ops; alternatively each hour can be checked | Average within 5% of 16.67 L/min at local conditions |  |
| **Variability in flow rate** | Every 24 hour of ops | CV ≤ 2% |  |
| **One-point Flow Rate Verification** | Every 30 days each separated by 14 days | < ± 4.1% of transfer standard &< ± 5.1% of flow rate design value |  |
| **Design Flow Rate Adjustment** | After multi-point calibration or verification | < ± 2.1% of design flow rate |  |
| **External Leak check** | Before each flow rate verification/calibration and before and after PM2.5 separator maintenance | < 1.5 L/min |  |
| **PM10 inlet** | At setup | Louvered PM10 size selective inlet as specified in CFR | 40 CFR App L, figs L-2 through L-19 |
| **PM2.5 inlet** | At setup | BGI VSCC or equivalent second stage separator approved for the method |  |

**Operational Criteria PM10/PM2.5 Continuous**

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| --- | --- | --- | --- |
| **Criteria (PM2.5/PM10)** | **2) Frequency** | **3) Acceptable Range** | **Comments** |
| **Temperature multi-point verification/calibration** | On installation, then every 365 days and 1/calendar year | < ± 2.1° C |  |
| **One-point temperature verification** | Every 30 days | < ± 2.1° C |  |
| **Pressure verification/calibration** | On installation, then every 365 days and 1/calendar year | < ± 10.1 mm Hg |  |
| **One-point pressure verification** | Every 30 days | < ± 10.1 mm Hg |  |
| **Flow rate multi-point verification/calibration** | Following any electromechanical maintenance or transport, or every 365 days and 1/calendar year | < ± 2.1 % of transfer standard |  |
| **72-hour zero test** | 1/yr.(1/6 mo. recommended) | Std dev of the data from a 72-hr zero test < 2.4 µg/m3 |  |

**Precision**

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| --- | --- | --- | --- |
| **Collocated samples** | Every 12 days for 15% of sites by method designation | CV < 10.1% of samples ≥ 3 µg/m3 |  |

**Accuracy**

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| --- | --- | --- | --- |
| **Temperature audit** | Every 180 days and at time of flow rate audit | < ± 2.1° C |  |
| **Pressure audit** | Every 180 days and at time of flow rate audit | < ± 10.1 mm Hg |  |
| **Flow Rate audit** | Twice a calendar year and 5-7 months apart | < ± 4.1 % of transfer standard &< ± 5.1 % of design flow rate |  |

**Shelter Temperature**

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| --- | --- | --- | --- |
| **Temperature range** | Daily | 20 to 30° C (hourly avg.) or per manufacturer’s specifications if designated to wider temp. range(0 to +50° C for BAM 1020, shelter temp stable to within ± 2° C per hour) |  |
| **Temperature control** | Daily (hourly values) | < 2.1° C Std Dev over 24 hours |  |
| **Temperature device check** | Every 180 days and twice a calendar year | < ± 2.1° C |  |
| **BAM routine inspection, cleaning, and maintenance** |  |  |  |
| **Inlet Head** | Every 30 days | Inspect, clean if necessary |  |
| **PM2.5 separator (VSCC)** | Every 30 days | cleaned/changed |  |
| **Down tube** | Every 90 days | cleaned |  |
| **Nozzle & vane** | 1/mo. or more often as needed | Inspect and clean |  |
| **Capstan shaft & roller** | 1/mo. | Inspect and clean |  |
| **Smart heater** | 1/yr. | Inspect and maintain |  |
| **Replace or clean pump muffler** | 1/6 mo. | Inspect, clean or replace |  |
| **Rebuild or replace pump** | 1/yr. | Rebuild or replace |  |
| **Clean or replace internal debris filter** | 1/yr. | Clean, replace as needed |  |
| **Membrane span foil check** | 1/yr. | Avg. < ± 5 % of ABS value |  |
| **Beta detector count rate**  | 1/yr. | Between 600,000 to 1,100,000 counts 4-min. test |  |
| **Dark Count Value** | 1/yr. | < 50 (recommended < 10)/4-min. test |  |
| **Data comparison internal data logger to external data logger** | Every 30 days 10 randomly selected values | Digital – exact match, analog ± 1 µg/m3 |  |

**Systematic Criteria PM10/PM2.5 Continuous**

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| --- | --- | --- | --- |
| **Criteria (PM2.5/PM10)** | **2) Frequency** | **3) Acceptable Range** | **Comments** |
| **Monitor** | - | Meets requirements listed in the FEM designation |  |
| **Siting** | Every 365 days and 1/calendar year | Meets citing criteria or waiver documented |  |
| **Data Completeness** | Quarterly | ≥ 75% scheduled sampling days in each quarter |  |

 **Reporting Units**

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| **PM2.5** | All concentrations | µg/m3 at ambient temperature & pressure |  |
| **PM10L (local conditions)** | All concentrations | µg/m3 at ambient temperature & pressure |  |
| **PM10S (standard conditions)** | All concentrations | µg/m3 corrected to standard temperature at 25° C & standard pressure at 760 mm Hg |  |
| **Rounding convention for data reported to AQS** | All concentrations | To one decimal place, with additional digits to the right truncated, or as reported by instrument |  |
| **Annual 3-yr. average** | All concentrations | Nearest 0.1 µg/m3 (≥ 0.05 round up) |  |
| **24-hour, 3-yr. average** | All concentrations | Nearest 1 µg/m3 (≥ 0.5 round up)  |  |
| **Detection Limits** |  |  |  |
| **Lower detection limit** | 24-hour avg. | < 1 µg/m3. |  |
|  | 1-hour avg. | < 4.8 µg/m3. |  |
| **Upper detection limit** | All hourly avgs. | 1000 µg/m3  |  |
| **Verification/calibration** **standards recertification** |  | All standards should have multi-point certifications against NIST-traceable standards |  |
| **Flow rate transfer standard** | Every 365 days and 1/calendar year | < ± 2.1% of NIST-traceable standard |  |
| **Field thermometer** | Every 365 days and 1/calendar year | ± 0.1° C resolution, ± 0.5° C accuracy |  |
| **Field barometer** | Every 365 days and 1/calendar year | ± 1 mm Hg resolution, ± 5 mm Hg accuracy |  |
| **Clock/timer verification** | Every 30 days | 1 minute/mo. |  |
| **Data Precision** |  |  |  |
| **Single analyzer (collocated monitors)** | Every 90 days | Coefficient of variation (CV) < 10.1% for values ≥ 3.0 µg/m3  |  |
| **Primary Quality Assurance Org.** | Annual and 3 yr. estimates | 90% CL of CV < 10.1% for values ≥ 3.0 µg/m3 |  |
| **Data Bias** |  |  |  |
| **Performance Evaluation Program (PEP)** | 5 audits for PQAOs with ≤ 5 sites8 audits for PQAOs with > 5 sites | < ± 10.1% for value > 3µg/m3  |  |

**Data Management Procedures and Documentation**

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| --- | --- |
| **1st Level Review** | **Comments and/or required actions** |
| **Daily review for limit checking, anomalies and irregularities** |  |
| **Review for data flags indicating out of limit conditions or instrument errors** |  |
| **PM coarse data comparison (PM10-PM2.5) for invalidation of negative values < - 5 µg/m3**  |  |
| **Logbook review: Station Logbook hardcopy and digital log entries** |  |

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| --- | --- |
| **1st Level Data Editing** |  |
| **Explanation of missing or invalidated data** |  |
| **Appropriate use of AQS null codes** |  |
| **Appropriate use of AQS data qualifiers** |  |
| **General Notes** |  |

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| **Critical and operational QC forms and NIST Traceable Certifications** | **Archived in Air Tools.** | **Comments and/or required actions** |
| **Most recent QA audit report and data sheets** |  |  |
| **1-point QC forms for all leak, flow, pressure, temperature and time checks.** |  |  |
| **BAM multi-point verification/calibration data sheets** |  |  |
| **BAM 72-hour zero air background checks data sheets** |  |  |
| **Images of station logbook notes and/or digital record of electronic log entries** |  |  |
| **Images of current NIST traceable certifications for all reference devices and transfer standards.** |  |  |
| **Date & Performed by:** |  |  |