

PM2.5 & PM10 Filter Based Local Conditions Data Review Table

Criteria	Frequency	Acceptable Range	Review Comments
CRITICAL CRITERIA – PM2.5/PM10 Filter Based Local Conditions			
Field Activities			
Sampler/Monitor	NA	<i>Meets requirements listed in FRM/FEM/ARM designation</i>	40 CFR Part 58 App C 40 CFR Part 53 & FRM/FEM method list
Sampling Period			
<i>Sampling Period (including multiple power failures)</i>	<i>All Filters</i>	<i>1380 – 1500 minutes, or if value <1380 and exceedance of NAAQS; midnight to midnight local std time</i>	40 CFR Part 50 App L (throughout)
Filter Holding Times			
<i>Sample Recovery</i>	<i>All Filters</i>	<i>≤ 7 days 9 hours from sample end time</i>	
<i>Pre-sampling</i>	<i>All filters</i>	<i>≤ 30 days before sampling</i>	
Sampling Instrument			
<i>Average Flow Rate</i>	<i>Every 24 hours of operation</i>	<i>Average within 5% of 16.67 liters/minute</i>	
<i>Variability in Flow Rate</i>	<i>Every 24 hours of operation</i>	<i>CV ≤ 2%; No flow rate excursions > ± 5% for > 5 minutes</i>	
<i>One-point Flow Rate Verification</i>	<i>Every 30 days each separated by at least 14 days</i>	<i>± 4.1% of transfer standard ± 5.1% of flow rate design value</i>	
<i>Design Flow Rate Adjustment</i>	<i>After 1-pt or multi-point verification/calibration</i>	<i>< ± 2.1 % of design flow rate</i>	
<i>External Leak Check</i>	<i>Before each flow rate verification/calibration and before and after PM2.5 separator maintenance</i>	<i>≤ 8.5” Hg in 30 sec (2000H) ≤ 25 mm Hg in 60 sec (2000i)</i>	
<i>Internal Leak Check</i>	<i>If failure of external leak check</i>	<i>≤ 8.5” Hg in 30 sec (2000H) ≤ 140 mm Hg in 60 sec (2000i)</i>	
<i>Filter Temp Sensor</i>	<i>Every 24 hrs of operation</i>	<i>No excursions > 5° C lasting longer than 30 minutes</i>	
Laboratory Activities			

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<i>Post Sampling Weighing</i>	<i>All filters</i>	<i>Kept < 25° C from sample retrieval to conditioning; ≤ 10 days from sample end date if shipped at ambient temperature, or ≤ 30 days if shipped below avg. ambient (or < 4° C or below for avg. sampling temps < 4 °C) from sample end date</i>	
<i>Filter Visual Defect Check (unexposed)</i>	<i>All filters</i>	<i>Correct type & size and for pinholes, particles or imperfections</i>	
Filter Conditioning Environment			
<i>Equilibration</i>	<i>All filters</i>	<i>24 hours minimum</i>	
<i>Temp. Range</i>	<i>All filters</i>	<i>24-hr mean 20.0-23.0° C</i>	
<i>Temp. Control</i>	<i>All filters</i>	<i>< 2.1° C Std Dev over 24 hours</i>	
<i>Relative Humidity</i>	<i>All filters</i>	<i>24-hr mean 30.0 – 40.0% RH or ≤ 5.0% sampling RH but ≥ 20.0% RH</i>	
<i>Humidity Control</i>	<i>All filters</i>	<i>< 5.1% Std Dev over 24 hours</i>	
<i>Pre/Post Sampling RH</i>	<i>All filters</i>	<i>Diff in 24-hr means < ± 5.1% RH</i>	
<i>Balance</i>	<i>All filters</i>	<i>Located in filter conditioning environment</i>	
<i>Balance auto-calibration</i>	<i>Prior to each weighing session</i>	<i>Manufacturer's specs</i>	
OPERATIONAL EVALUATIONS TABLE - PM2.5/PM10 Filter Based Local Conditions			
Field Activities			
Routine Verifications			
<i>1-point Temp. Verification</i>	<i>Every 30 days</i>	<i>< ± 2.1° C</i>	
<i>Press. Verification</i>	<i>Every 30 days</i>	<i>< ± 10.1 mm Hg</i>	
Annual Multi-point Verifications/Calibrations			
<i>Temp. multi-point verifications/calibrations</i>	<i>Upon installation, then 1/yr.</i>	<i>< ± 2.1° C</i>	
<i>Pressure verification/calibration</i>	<i>Upon installation, and upon 1-pt verification failure</i>	<i>< ± 10.1 mm Hg</i>	

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Flow rate multi-point verification/calibration	Upon installation, maintenance or transport, then 1/yr.	< ± 2.1% of transfer standard	
Other Monitor Calibrations	Per manufacturer's operation manual	Per manufacturer's operation manual	
Precision			
Collocated Samples SLAMS	Every 12 days for 15% of sites by designation	CV < 10.1% of samples ≥ 3.0 µg/m ³	
Collocated Samples PSD	Every 6 days for 15% of sites by designation	CV < 10.1% of samples ≥ 3.0 µg/m ³	
Accuracy	<i>Note: All equipment and transfer standards used for QA audits must be independent of the equipment used for routine QC activities such as 1-point and multi-point verifications and calibrations</i>		
Temp. Audit	SLAMS every 180 days PSD Quarterly.	< ± 2.1 °C	
Press. Audit	SLAMS every 180 days PSD Quarterly	< ± 10.1 mm Hg	
Flow Rate Audit	SLAMS every 5-7 months PSD Quarterly	< ± 4.1% of audit standard < ± 5.1% of design flow rate	
Monitor Maintenance			
Very Sharp Cut Cyclone	Every 30 days	Cleaned/changed	
Inlet/downtube cleaning	Every 90 days	Cleaned	
Filter chamber cleaning	1/mo.	Cleaned	
Circulating fan/filter	1/mo.	Cleaned/changed	
Manufacturer's Recommended Maintenance	Per manufacturer's operations manual	Per manufacturer's operations manual	
Laboratory Activities			
Filter Checks			
Lot Blanks	9 filters per lot	< ± 15.1 µg change between weighings	
Exposure Lot Blanks	3 filters per lot	< ± 15.1 µg change between weighings	
Filter Integrity (exposed)	Each filter	No visual defects	
Lab QC Checks			
Field Filter Blanks	10% or 1 per weighing session	< ± 30.1 µg change between weighings	

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Lab Filter Blanks	10% or 1 per weighing session	< ± 15.1 µg change between weighings	
Balance Check (working standards)	Beginning, 10 th sample, end	< ± 3.1 µg	
Duplicate Filter Weighing	1 per weighing session	< ± 15.1 µg change between weighings	
Microbalance Audit	1/yr.	< ± 0.003 mg or manufacturer's specs, whichever is tighter	
Verification/Calibrations			
Lab Temperature	Every 90 days	< ± 2.1 °C	
Lab Humidity	Every 90 days	< ± 2.1 %	
Microbalance Calibration	At Installation & 1/yr.	Manufacturer's specifications	
Calibrations & Check Standards			
Working Mass Standards (compared to primary standards)	Every 90 days	< ± 2.1 µg	
Primary Standards	1/yr.	0.025 mg	
SYSTEMATIC CRITERIA – PM2.5/PM10 Filter Based Local Conditions			
Siting	1/yr.	SLAMS Meets siting criteria or waiver documented PSD as per approved QAPP	
Data Completeness SLAMS (3-year averaging period to calculate NAAQS compliance)	Annual Standard 24-hour Standard	≥ 75% scheduled sampling days per quarter ≥ 75% scheduled sampling days per quarter	
Data Completeness PSD (typically a 1-year monitoring period)	Annual Standard 24-hour Standard	≥ 80% of scheduled sampling days per quarter ≥ 80% of scheduled sampling days per quarter	
Reporting Units	All filters	µg/m ³ at ambient temp/press (PM2.5)	
Rounding convention for DV calculation and data reported to AQS	All filters	To one decimal, with additional digits to the right being truncated	

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<i>Annual 3-yr average</i>	<i>All concentrations</i>	<i>Nearest 0.1 µg/m³ (≥0.05 round up)</i>	
<i>24-hour, 3-yr average</i>	<i>All concentrations</i>	<i>Nearest 1 µg/m³ (≥0.5 round up)</i>	
Detection Limit			
<i>Lower detection limit</i>	<i>All filters</i>	<i>≤ 2 µg/m³</i>	
<i>Upper concentration limit</i>	<i>All filters</i>	<i>≥ 200 µg/m³</i>	
Precision			
<i>Single analyzer (collocated monitors)</i>	<i>Every 90 days</i>	<i>Coefficient of variation (CV) < 10.1% for values ≥ 3.0 µg/m³</i>	
<i>Primary Quality Assurance Organization (PQAO)</i>	<i>Annual and 3 year estimates</i>	<i>90% confidence level (CL) of CV < 10.1% for values ≥ 3.0 µg/m³</i>	
Bias			
<i>Performance Evaluation Program (PEP) SLAMS</i>	<i>5 audits for PQAOs with ≤ 5 sites 8 audits for PQAOs with > 5 sites</i>	<i>< ± 10.1% for values ≥ 3.0 µg/m³</i>	
<i>Performance Evaluation Program (PEP) PSD</i>	<i>1/yr.</i>	<i>< ± 10.1% for values ≥ 3.0 µg/m³</i>	
<i>Technical Systems Audit SLAMS</i>	<i>1/3 yr.</i>	<i>Review of entire field, lab, and data reporting process for comparison to QC/QA requirements</i>	
<i>Technical Systems Audit PSD</i>	<i>1/project, if extended 1/yr.</i>	<i>Review of entire field, lab, and data reporting process for comparison to QC/QA requirements</i>	
Field Activities			
Verification/Calibration Standards Recertification – All standards should have multi-point certifications against NIST traceable standards			
<i>Flow Rate Transfer Standard</i>	<i>Every 365 days</i>	<i>< ± 2.1% of NIST Traceable Standard</i>	
<i>Field thermometer</i>	<i>Every 365 days</i>	<i>± 0.1° C resolution ± 0.5° C accuracy</i>	
<i>Field barometer</i>	<i>Every 365 days</i>	<i>± 1 mm Hg resolution ± 5 mm Hg accuracy</i>	
<i>Clock/timer verification</i>	<i>Every 30 days</i>	<i>± 1 min NIST AST</i>	
Laboratory Activities			
<i>Microbalance Readability</i>	<i>At purchase</i>	<i>1µg</i>	
<i>Microbalance Repeatability</i>	<i>At purchase</i>	<i>1µg</i>	

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<i>Primary mass/Working mass Verification/Calibration Standards Recertification</i>	<i>1/yr</i>	<i>0.025 mg tolerance</i>	