

Environmental Protection Agency

Pt. 53, Subpt. E, Table E-1

an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(e) *Test setup.* (1) The candidate test sampler shall have its inlet and impactor or impactors removed. The lower end of the down tube shall be reconnected to the filter holder, using an extension of the downtube, if necessary. If the candidate sampler has a separate impactor for each channel, then for this test, the filter holder assemblies must be connected to the physical location on the sampler where the impactors would normally connect.

(2) The test particle delivery system shall be connected to the sampler downtube so that the test aerosol is introduced at the top of the downtube.

(f) *Test procedure.* (1) All surfaces of the added or modified component or components which come in contact with the aerosol flow shall be thoroughly washed with 0.01 N NaOH and then dried.

(2) Generate aerosol. (i) Generate aerosol composed of oleic acid with a uranine fluorometric tag of $3 \pm 0.25 \mu\text{m}$ aerodynamic diameter using a vibrating orifice aerosol generator according to conventions specified in §53.61(g).

(ii) Check for the presence of satellites and adjust the generator to minimize their production.

(iii) Calculate the aerodynamic particle size using the operating parameters of the vibrating orifice aerosol generator. The calculated aerodynamic diameter must be $3 \pm 0.25 \mu\text{m}$ aerodynamic diameter.

(3) Verify the particle size according to procedures specified in §53.62(d)(4)(i).

(4) Collect particles on filters for a time period such that the relative error

of the resulting measured fluorometric concentration for the active filter is less than 5 percent.

(5) Determine the quantity of material collected on the active filter using a calibrated fluorometer. Record the mass of fluorometric material for the active filter as $M_{\text{active}(i)}$ where i = the active channel number.

(6) Determine the quantity of material collected on each no-flow filter using a calibrated fluorometer. Record the mass of fluorometric material on each no-flow filter as $M_{\text{no-flow}}$.

(7) Using 0.01 N NaOH, wash the surfaces of the added component or components which contact the aerosol flow. Determine the quantity of material collected using a calibrated fluorometer. Record the mass of fluorometric material collected in the wash as M_{wash} .

(8) Calculate the aerosol transport as:

EQUATION 29

$$T_{(i)} = \frac{M_{\text{active}}}{M_{\text{active}} + M_{\text{wash}} + \sum M_{\text{no-flow}}} \times 100\%$$

where:

i = the active channel number.

(9) Repeat paragraphs (f)(1) through (8) of this section for each channel, making each channel in turn the exclusive active channel.

(g) *Test results.* The candidate Class I sampler passes the aerosol transport test if $T_{(i)}$ is at least 97 percent for each channel.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61293, Oct. 17, 2006]

TABLE E-1 TO SUBPART E OF PART 53—SUMMARY OF TEST REQUIREMENTS FOR REFERENCE AND CLASS I EQUIVALENT METHODS FOR $\text{PM}_{2.5}$ AND $\text{PM}_{10-2.5}$

| Subpart E procedure | Performance test | Performance specification | Test conditions | Part 50, appendix L reference |
|--------------------------------|------------------------------|--|---|-------------------------------|
| §53.52 Sample leak check test. | Sampler leak check facility. | External leakage: 80 mL/min, max. Internal leakage: 80 mL/min, max. | Controlled leak flow rate of 80 mL/min. | Sec. 7.4.6. |

Pt. 53, Subpt. E, Table E-1

40 CFR Ch. I (7-1-10 Edition)

| Subpart E procedure | Performance test | Performance specification | Test conditions | Part 50, appendix L reference |
|--|---|---|---|--|
| § 53.53 Base flow rate test. | Sample flow rate 1. Mean 2. Regulation 3. Meas accuracy 4. CV accuracy 5. Cut-off | 1. $16.67 \pm 5\%$, L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. Flow rate cut-off if flow rate deviates more than 10% from design flow rate for $>60 \pm 30$ seconds. | (a) 6-hour normal operational test plus flow rate cut-off test. (b) Normal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter. (d) Variable flow restriction used for cut-off test. | Sec. 7.4.1. Sec. 7.4.2. Sec. 7.4.3. Sec. 7.4.4. Sec. 7.4.5. |
| § 53.54 Power interruption test. | Sample flow rate 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Occurrence time of power interruptions. 6. Elapsed sample time 7. Sample volume | 1. $16.67 \pm 5\%$, L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. ± 2 min if >60 seconds. 6. ± 20 seconds 7. $\pm 2\%$, max | (a) 6-hour normal operational test. (b) Nominal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter. (d) 6 power interruptions of various durations. | Sec. 7.4.1. Sec. 7.4.2. Sec. 7.4.3. Sec. 7.4.5. Sec. 7.4.12. Sec. 7.4.13. Sec. 7.4.15.4. Sec. 7.4.15.5. |
| § 53.55 Temperature and line voltage test. | Sample flow rate 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Temperature meas. accuracy. 6. Proper operation. | 1. $16.67 \pm 5\%$, L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. 2 °C | (a) 6-hour normal operational test. (b) Normal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter. (d) Ambient temperature at -20 and $+40$ °C. (e) Line voltage: 105 Vac to 125 Vac. | Sec. 7.4.1. Sec. 7.4.2. Sec. 7.4.3. Sec. 7.4.5. Sec. 7.4.8. Sec. 7.4.15.1. |
| § 53.56 Barometric pressure effect test. | Sample flow rate 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Pressure meas. accuracy. 6. Proper operation. | 1. $16.67 \pm 5\%$, L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. 10 mm Hg | (a) 6-hour normal operational test. (b) Normal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter. (d) Barometric pressure at 600 and 800 mm Hg. | Sec. 7.4.1. Sec. 7.4.2. Sec. 7.4.3. Sec. 7.4.5. Sec. 7.4.9. |
| § 53.57 Filter temperature control test. | 1. Filter temp. meas. accuracy. 2. Ambient temp. meas. accuracy. 3. Filter temp. control accuracy, sampling and non-sampling. | 1. 2 °C 2. 2 °C 3. Not more than 5 °C above ambient temp. for more than 30 min. | (a) 4-hour simulated solar radiation, sampling. (b) 4-hour simulated solar radiation, non-sampling. (c) Solar flux of 1000 ± 50 W/m ² . | Sec. 7.4.8. Sec. 7.4.10. Sec. 7.4.11. |
| § 53.58 Field precision test. | 1. Measurement precision. 2. Storage deposition test for sequential samplers. | 1. $P_1 < 2 \mu\text{g}/\text{m}^3$ or $\text{RP}_1 < 5\%$. 2. 50 μg max. average weight gain/blank filter. | (a) 3 collocated samplers at 1 site for at least 10 days. (b) $\text{PM}_{2.5}$ conc. $> 3 \mu\text{g}/\text{m}^3$... (c) 24- or 48-hour samples (d) 5- or 10-day storage period for inactive stored filters. | Sec. 5.1. Sec. 7.3.5. Sec. 8. Sec. 9. Sec. 10. |
| The Following Requirement Is Applicable to Class I Candidate Equivalent Methods Only | | | | |
| § 53.59 Aerosol transport test. | Aerosol transport | 97%, min. for all channels.. | Determine aerosol transport through any new or modified components with respect to the reference method sampler before the filter for each channel. | |

[72 FR 32208, June 12, 2007]