



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

January 19, 2000

MEMORANDUM

SUBJECT: Additional Guidance on PM_{2.5} Cassette Handling and Transportation

FROM: J. David Mobley, Acting Director (*Original Signed by Fred Dimmick For*)
Emissions, Monitoring & Analysis Division (MD-14)

TO: Deputy Director, Office of Ecosystem Protection, Region I
Director, Environmental Planning and Protection Division, Region II
Director, Air Protection Division, Region III
Director, Air, Pesticides, and Toxics Management Division, Region IV
Director, Air and Radiation Division, Region V
Director, Multimedia Planning and Permitting Division, Region VI
Director, Air, RCRA, and Toxics Division, Region VII
Director, Air Program, Region VIII
Director, Air Division, Region IX
Director, Office of Air Quality, Region X

This memorandum transmits additional interpretive nonbinding guidance on the handling and transportation of PM_{2.5} filter cassettes upon completion of sampling. We plan on revising QA Handbook Method 2.12 in the near future and will include the attached guidance.

40 CFR Part 50, Appendix L, Section 8.3.6 provides requirements for post-sampling conditioning and weighing, which also effects sample transport conditions. Since the implementation of the PM_{2.5} network, State and local monitoring agencies have voiced their concerns about the filter transport requirements, particularly about meeting the requirement for filter transport at less than 4EC and the effect that an excursion of greater than 4EC during sample transport has on data validity and time requirements for laboratory analysis.

Attachment

cc: Director, Office of Environmental Measurement and Evaluation, Region I
Director, Environmental Services and Assessment Division, Region II
Director, Environmental Services Division, Regions III and VII
Director, Science & Ecosystems Support Division, Region IV

Director, Resource Management Division, Region V

Assistant Regional Administrator, Management Division, Region VI

Assistant Regional Administrator, Office of Technical and
Management Services, Region VIII

Assistant Regional Administrator, Policy and Management Division, Region IX

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ATTACHMENT

8.2.4 Sample Handling

8.2.4.1 Filter Handling Requirements for weighed un-exposed filters from the weigh room laboratory to the field:

Filters are installed in filter cassettes and stored in their protective containers. Protective containers may either be ones provided with sampler equipment if they protect the filters from contamination or static-resistant self-sealing storage bags. Protection from exposure and excessive heat is important. No specific temperature monitoring is required.

8.2.4.2 Filter Handling Requirements for exposed filters from the field to the weigh room laboratory:

The goal of post-sampling filter handling is to minimize contamination and preserve the collected sample. Contamination is minimized by retrieving the exposed filter promptly after the end of the sample period (must be within 96 hours¹) and storing and transporting the filter sample in a clean protective container. The sample is preserved by 1) retrieving it promptly after the sample period, 2) transporting it expeditiously from the field to the analytical laboratory, 3) keeping the sample cool during transport and storage, and 4) conditioning and weighing the sample as soon as is practical after collection.

Even samples collected during warm or hot weather may contain semi-volatile components that are subject to gradual loss during the period between the end of the sample collection period and the post-collection weighing. These losses are minimized by cooling the sample as soon as possible during this period and weighing it promptly. The reference method specifications require that the sample be maintained at a temperature of not more than 25EC (77EF) between retrieval from the sampler and the start of the conditioning period, and further, that the sample be weighed not more than 10 days after the end of the sampler period. However, the specifications also allow the post-sampling weighing to be up to 30 days after the end of the sample period, provided the sample is maintained at a temperature of not more than 4EC (39EF) between retrieval and the start of the conditioning period². These requirements illustrate the tradeoff between transport/storage temperature and elapsed time until the post-sampling weighing, which also allows for intermediate temperature-time conditions as described below.

During transport to the laboratory, the exposed filters in their cassettes can be stored in their protective containers. Protective containers may either be ones provided with sampler equipment, if they protect the filters from contamination, or static-resistant self-sealing storage bags. The protective container may be appropriately sized so that the collected sample does not directly touch the interior surface of the container. Samples, accompanied by the completed run data sheet, can be packed in an insulated protective container (a small cooler for example) with as many containers of

¹ 40 CFR Part 50, Appendix L, Section 10.10

² 40 CFR Part 50, Appendix L, Section 8.3.6

frozen ice substitute as needed to keep the samples cool during the transport period (see validation guidance below). The temperature inside the transport container can be monitored with a maximum/minimum thermometer or other indicator of temperature, especially of maximum temperature. Package and handle the samples in a manner that reduces vibrations that may dislodge particles from the filters. Upon arrival at the laboratory, the samples may be stored in a refrigerator at approximately 4EC (39EF) or less until the start of the conditioning period.

8.2.4.3 Validation of samples

Validation of samples for post-collection transport and weighing may be based on the following guidance:

- < The elapsed time clock starts at the end of the sample period.
- < The sample must be retrieved from the sampler within 96 hours from the end of the sample period¹.
- < Upon removal of the filter from the sampler, the filter is inserted into a clean, protective container, which is placed in the filter transport container with appropriate cooling.
- < A minimum/maximum thermometer or alternative method of monitoring the filter temperature and recording the maximum filter temperature, such as a liquid crystal temperature sensor strip, is reset and put in the transport container to monitor filter temperature during transport.

10-day weigh limit:

1. Include enough coolant packages or other cooling means in the transport container to maintain filters as cool as practical; but no more than 25EC (77EF) or less during transport².
2. Transport the filters in the transport container to the laboratory expeditiously.
3. Upon arrival at the lab, verify from the minimum/maximum thermometer (or alternative temperature monitor) that the filter temperature has been maintained at 25 degrees or less.
4. Note the sample end date and determine the 10-day post-weigh deadline.
5. Transfer the filters to a refrigerator maintained at 4EC (39EF) or lower for storage until the beginning of the conditioning period.
6. Complete the required post-sampling conditioning period and weighing as soon as practical but not later than the 10-day deadline.

30-day weigh limit:

1. Include enough coolant packages in the transport container to maintain filters at 4EC (39EF) or less during transport.
2. Promptly transport the filters in the transport container to the laboratory.
3. Upon arrival at the lab, verify from the minimum/maximum thermometer (or alternative temperature monitor) that the filter temperature has been maintained at 25 degrees or less.

4. Estimate the average temperature of the samples during transit, such as:

$$T_{ave} = (T_{max} + T_{min})/2.$$

5. Determine the elapsed time deadline for post weighing as:

$$D = 34 ! T_{ave}$$

where D = number of days from the end of the sample period, but not more than 30, or less than 10 and T_{ave} is in degrees C.

4. Note the sample end date and determine the post-weigh deadline as D days later.
5. Transfer the filters to a refrigerator maintained at 4EC (39EF) or lower for storage until the beginning of the conditioning period.
6. Complete the required post-sampling conditioning period and weighing as soon as practical but not later than the deadline determined above.