Observer/Report Review Checklists for Source Tests

The following checklists are to assist the on-site observer during a performance or compliance test. These checklists were developed with the expectation that the observer has a general working knowledge of the applicable test method(s). For each question on the checklists, the corresponding test method section citation is included to the left of the question. Use of these checklists does not in and of itself create a regulatory requirement for each item in the checklist. Rather, these checklists are intended to serve as an informative aid to the observer of source tests and to the reviewer of source test reports.

The checklists contained in this package cover the following:

- Pre-Test Questionnaire;
- Methods 1-4;
- Method 5;
- Instrumental Methods 3A-O_2/CO_2, 6C-SO_2, 7E-NO_x, and 10-CO;
- Method 29; and
- Contents of a source test report.

Before observing the source test, the following activities should be considered:

- Review the Pre-Test Questionnaire;
- Review the applicable standards for the source (permit, NSPS, NESHAP, etc.);
- Read the approved test protocol;
- Review any previous test reports;
- Read the performance standard(s)/test method(s) listed in the test protocol;
- Review the checklists. If you have questions, refer to the citation to the left of the question or additional information on the EMC website (https://www.epa.gov/emc); and
- Contact the site test coordinator to get a list of security and health and safety requirements necessary to get on site.

Strongly encourage the testing company to completely fill out the Pre-Test Questionnaire. Using the information provided on the Pre-Test Questionnaire, determine the traverse points, calculate nozzle size(s), and review the calibration data. When on-site, check the information provided and compare traverse points and nozzle size determinations with the tester. Check that the calibration records provided are for the equipment being used for the source test. Inspect pitot tips for damage.

On the day of the test, be sure to have your ID and safety cards, appropriate and required personal protective equipment (PPE), and checklists together before entering the facility. When arriving at the test site, let the lead for the testing company/facility representative (test coordinator) know the information you will collecting, which should include but not be limited to:

- Equipment calibration sheets;
- Daily calibration sheets;
- Certificate of Analysis of cylinder gases;
- Field data sheets;
- Recovery data sheets; and
- Chains of custody.

During your observation of the test, if you notice anything wrong or done well, let the source testing lead and facility test coordinator know. If something is being or was performed incorrectly, it may be possible to correct the problem and save the test run. If something was performed well, letting the test team know may ease tension and open up communication. Either way, speak up.

Pre-Test Questionnaire

PLEASE COMPLETE AND SUBMIT THIS QUESTIONNAIRE 7 DAYS PRIOR TO THE TEST		
Facility Contact / Phone :		
Testing Firm / Contact :		
Permit #:		
Source Tested:		
Applicable Regulation(s) / Pollutant(s) :		
Process Data / Production Rate :		
Is there an approved test protocol? If yes, please submit it with this questionnaire.	YES	NO
Are there any anticipated or expected deviations or alternatives from the approved test methods? If yes, note in the comments section below	YES	NO
Have you or your company tested this source before?	YES	NO
Are there any diagrams/schematics/pictures of testing location(s)? If yes, please submit it with this questionnaire.	YES	NO
Are the testing location adequate to perform testing safely and accurately?	YES	NO
Do sampling location(s) meet the criteria of Method 1? If not, please provide testing approach in comments below.	YES	NO
Are the planned total sampling times and volumes greater than or equal to the specified test procedures?	YES	NO

Comments:

Please provide a proposed schedule for testing in Table 1.

Please provide a schematic of the testing location(s) in Figures 1 & 2.

Please provide calibration records for all testing equipment to be used during this source test program. If the most current calibration is not available for this submission, please provide the most recent calibration or standard operating procedures (SOPs) for equipment calibrations and have the current calibration available on the first day of testing.

Table 1. Source Testing Daily Schedule

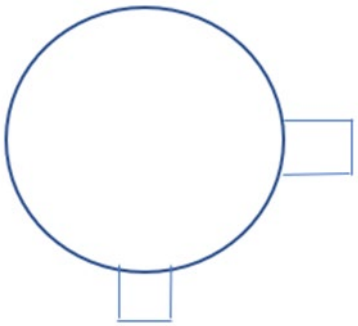
Test Day	Date		Activity	Total Daily Hrs
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		

Example of Source Testing Daily Schedule

Test Day	Date		Activity	Total Daily Hrs
1		AM	Safety training and set-up	10
		PM	RATA	
2		AM	Runs 1 & 2 (M5/26A and CEMS)	10
		PM	Run 3 (M5/26A and CEMS) and breakdown	
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		
		AM		
		PM		

Schematic of Source(s)

Figure 1. Top View

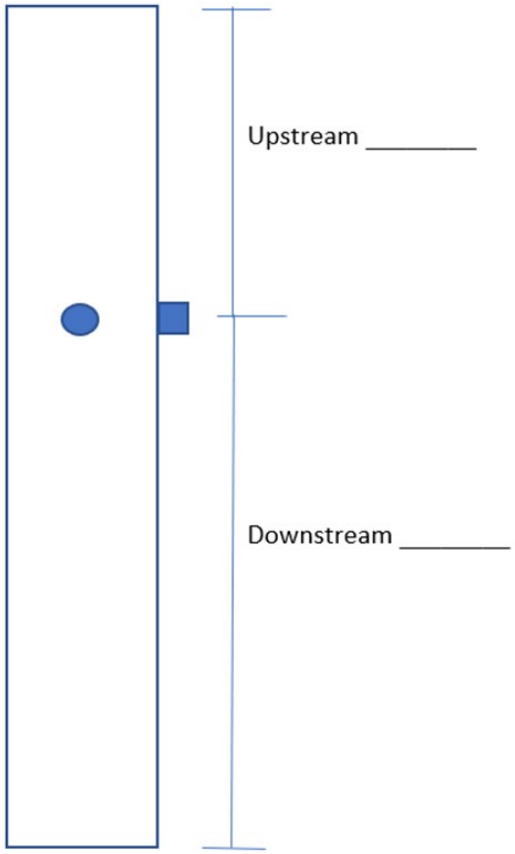


Stack Diameter _____

Port “A” Length _____

Port “B” Length _____

Figure 2. Side View



Date:_____
Observer:_____

Observer Checklist – Methods 1-4

Facility Name / Location :			
Facility Contact / Phone :			
Testing Firm / Contact :			
Permit #:			
Source Tested:			
Applicable Regulation(s) / Pollutant(s) :			
Process Data / Production Rate :			
If the answer is NO to any questions below, provide comments.			
Method 1 – Sample and Velocity Traverses for Stationary Sources		YES	NO
§ 11.2	Were traverse points determined correctly? (see Figures PRELIM-1 and 2)		
§ 11.4	Was a cyclonic flow check completed? (Avg of absolute value of all angles <20°)		
§ 11.5	Alternative Measurement Site Selection (answer questions below only if needed)		
§ 11.5.2	Were a minimum of 40 traverse points (42 pts for rectangular ducts) used for gas flow angle determination?		
§ 11.5.3.1	Did the pre-test leak check pass? (optional) Leak rate:		
§ 11.5.3.2	Is the manometer leveled and zeroed?		
§ 11.5.3.3	Were the yaw angles and pressure readings for pitch angle recorded?		
§ 11.5.3.3	Was a back purge completed between traverse points?		
§ 11.5.3.4	Did the post-test lek check pass? (mandatory) Leak rate:		
Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate		YES	NO
§ 8.1	Is the measurement system set up properly? (see Figure PRELIM-3)		
§ 8.2	Is the manometer level and zeroed correctly?		
§ 8.3	Are the velocity and stack temperature recorded at each sampling point?		
§ 8.3	Are the pitot tube leak checks completed after each run?		
§ 8.4	Was the static pressure measured during the test day?		
§ 8.5	Is the barometric pressure recorded and adjusted for elevation (if needed)?		
§ 10.1	Visual check of pitot tube heads – good condition?		

Date:_____
Observer:_____

Observer Checklist – Methods 1-4 (continued)

Method 3 – Gas Analysis for O_2, CO_2, and Dry Molecular Weight		YES	NO
If Method 3A is being used to determine O_2 and CO_2 concentrations, skip this section.			
§8.0	Single- or multi-point sampling used? Circle answer.		
§8.0	Grab or integrated sampling used? Circle answer.		
§8.0	Orsat or Fyrites being used? Circle answer.		
§11.0	Is Orsat performed in triplicate? Is analysis consistent?		
Method 4 – Determination of Moisture Content in Stack Gases		YES	NO
Method 5, 6A, 320, and using F-factors are acceptable alternatives to Method 4.			
§8.1.1.2	Minimum sample volume of 0.60 scm (21 scf) at ≤ 0.021 m^3/min (0.75cfm) achieved?		
§8.1.2.1	Was the sampling train set up correctly? (see Figure PRELIM-4)		
§8.1.3.1	Did the pre-test leak check pass? (optional) Leak rate:		
§8.1.4.1	Temperature at the exit of impingers/condenser <68 °F?		
8.1.4.2	Did the post-test leak check pass? (mandatory) Leak rate:		
§12.1.6	From point to point, was the ΔV_m >10% from the average sampling rate?		
§12.1.7	For saturated or moisture-laden gas steam, was the lower B_{ws} used?		

Comments:

Figure PRELIM-1. Minimum Number of Traverse Point for Particulate Traverse

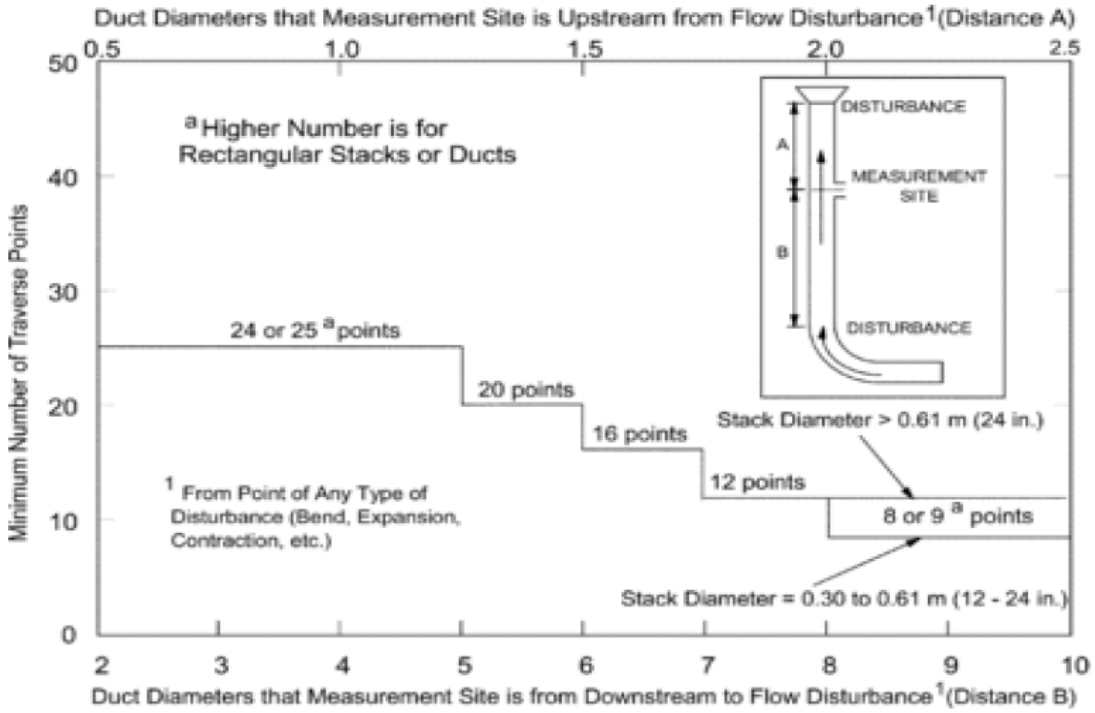


Figure PRELIM-2. Minimum Number of Traverse Point for Velocity (non-particulate) Traverse

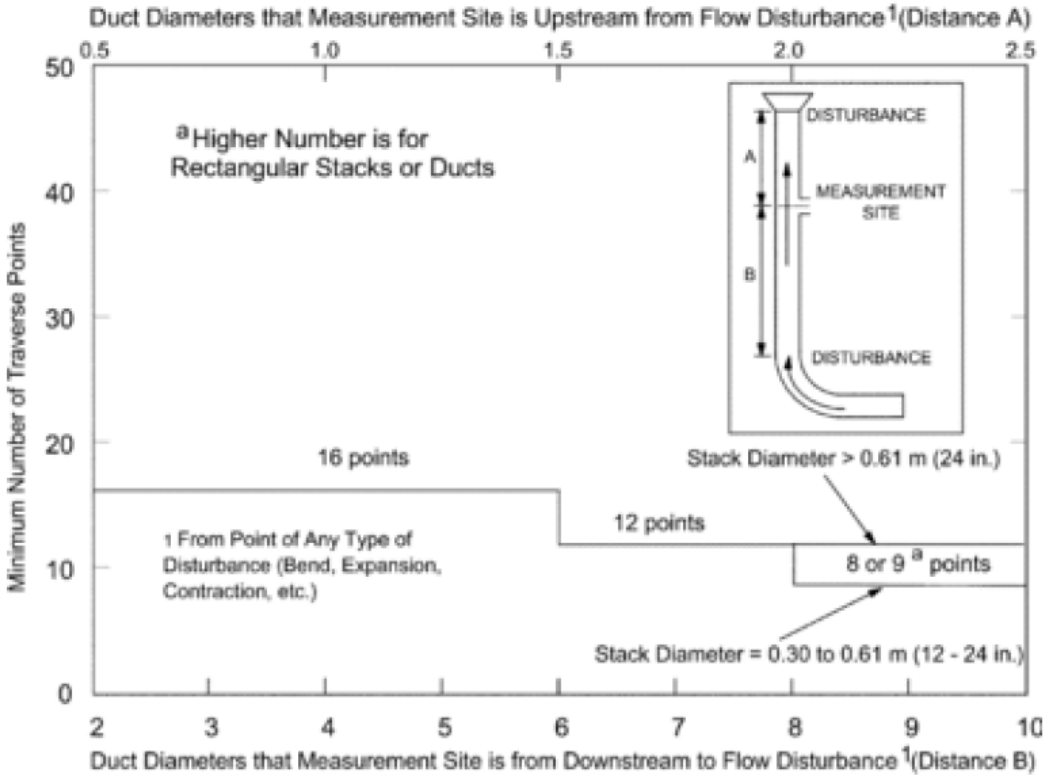


Figure PRELIM-3. Pitot Tube and Manometer Assembly

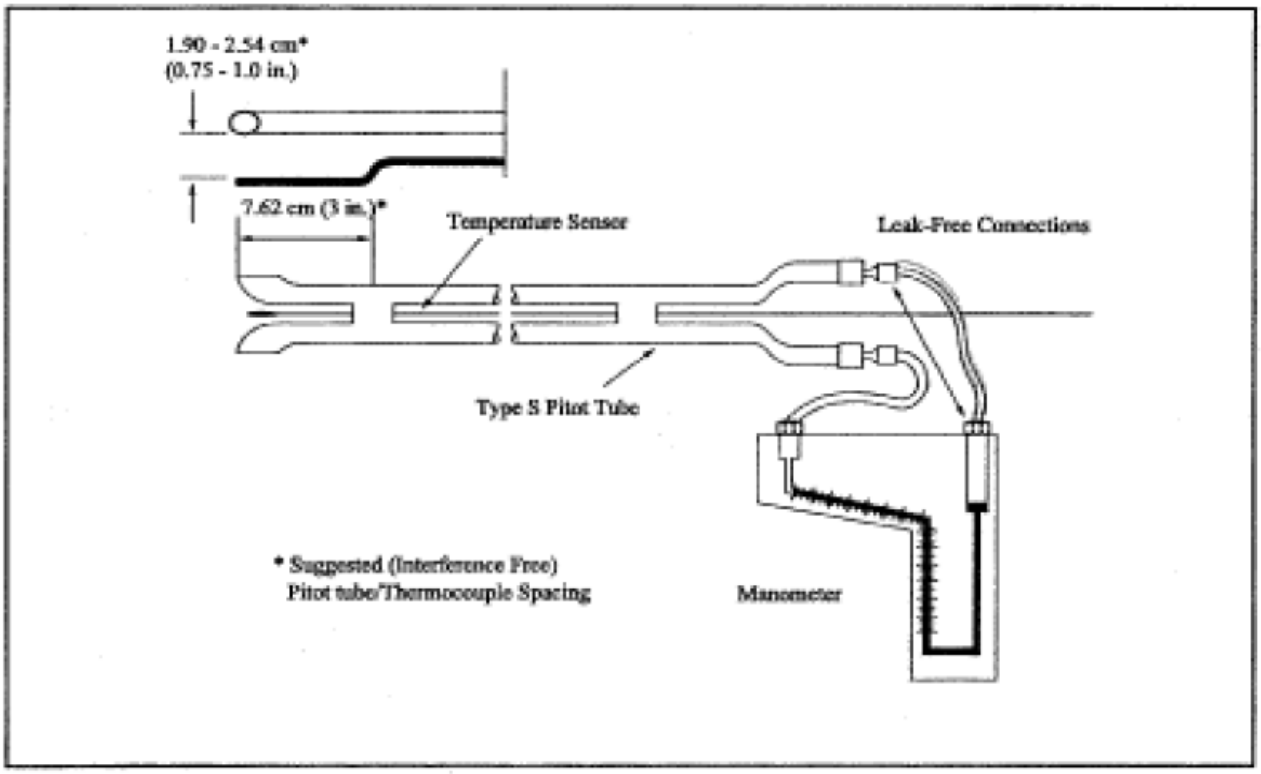
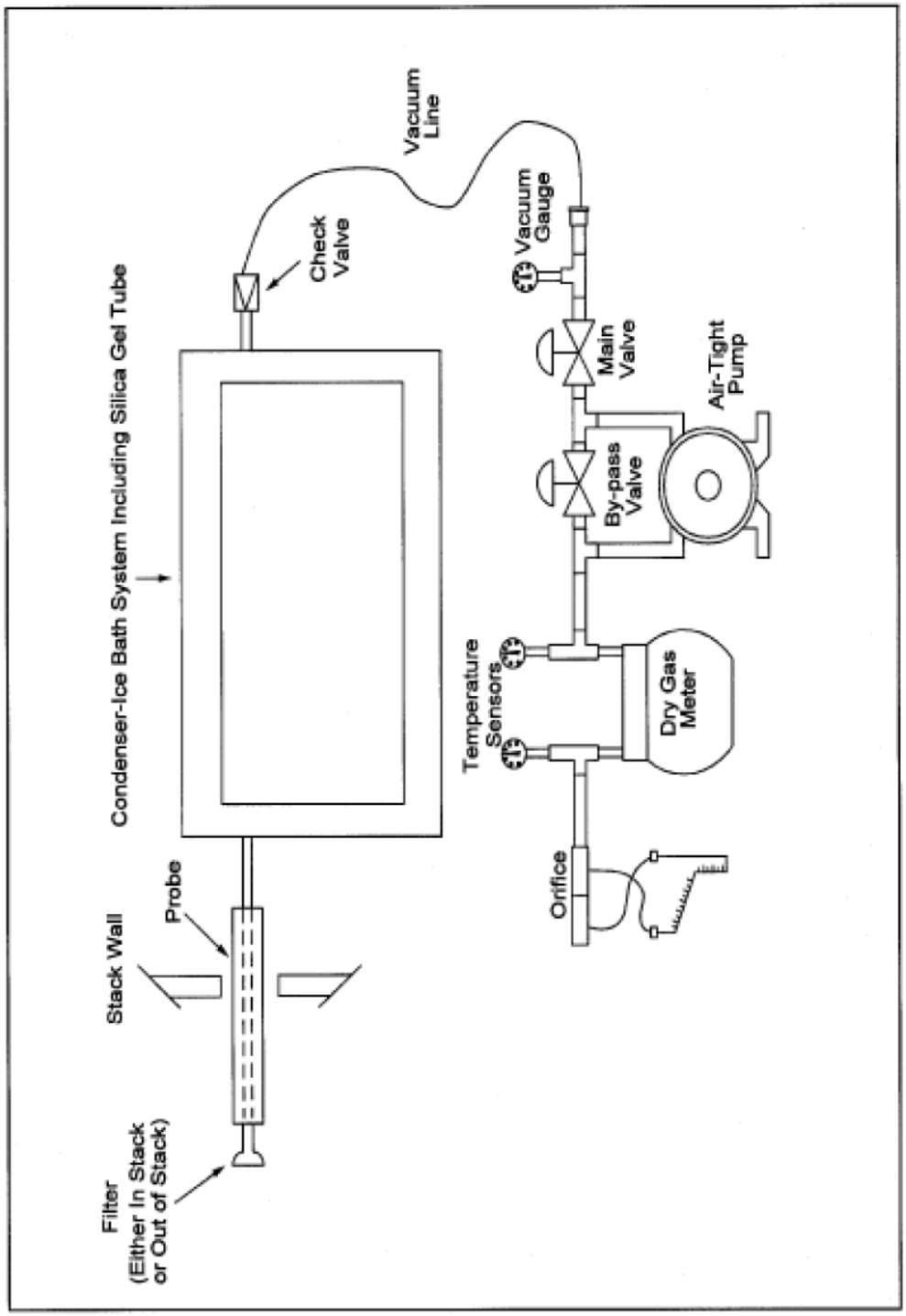


Figure PRELIM-4. Method 4 Sampling Train Assembly



Date:_____
Observer:_____

Observer Checklist – Reference Method 5 - Particulate Matter Emissions

Facility Name / Location :			
Facility Contact / Phone :			
Testing Firm / Contact :			
Permit #:			
Source Tested:			
Applicable Regulation(s) / Pollutant(s) :			
Process Data / Production Rate :			
Method 5 – Determination of Particulate Matter Emissions from Stationary Sources		YES	NO
If the answer is NO to any questions, provide comments below.			
§8.2.4	Is the planned total sampling time and volume greater than or equal to the specified test procedure?		
§8.3	Was the sampling train set up correctly? (see Figure M5-1) Nozzle Diameter:_____ Probe Length:_____		
§8.3.2	Was the filter properly centered in the filter holder and free from tears?		
§8.3.3	Glass or metal probe liner? Circle answer.		
§8.4.2	Did the sampling train pre-test leak check pass? (optional) Leak rate:		
§8.4.4	Did the sampling train post-test leak check pass? (mandatory) Leak rate:		

Date:_____
Observer:_____

Observer Checklist – Reference Method 5 - Particulate Matter Emissions (continued)

If the answer is NO to any questions, provide comments below.		YES	NO
§8.5	Was the temperature gas flow through the filter during the run at 120 ± 14 °C (248 ± 25 °F)?		
§8.5.1	Is the data being recorded on a datasheet at least once at each sample point during each time increment?		
§8.5.2	Were the portholes cleaned prior to the test run?		
§8.5.3	For stack with significant negative pressure, sampling pumps can be started prior to going into the stack.		
§8.5.4	Is the port properly sealed around the sample probe?		
§8.5.5	Is the sampling train being traversed per Method 1?		
§8.5.6	Is the temperature of the gas exiting the sampling train <20 °C (68° F)?		
§8.5.7	Was the test run completed without changing the filter?		
§8.5.8	Was the test run completed without changing the sampling train?		
§8.6	Was the sampling train operated isokinetically (100 ± 10%)?		

Comments:

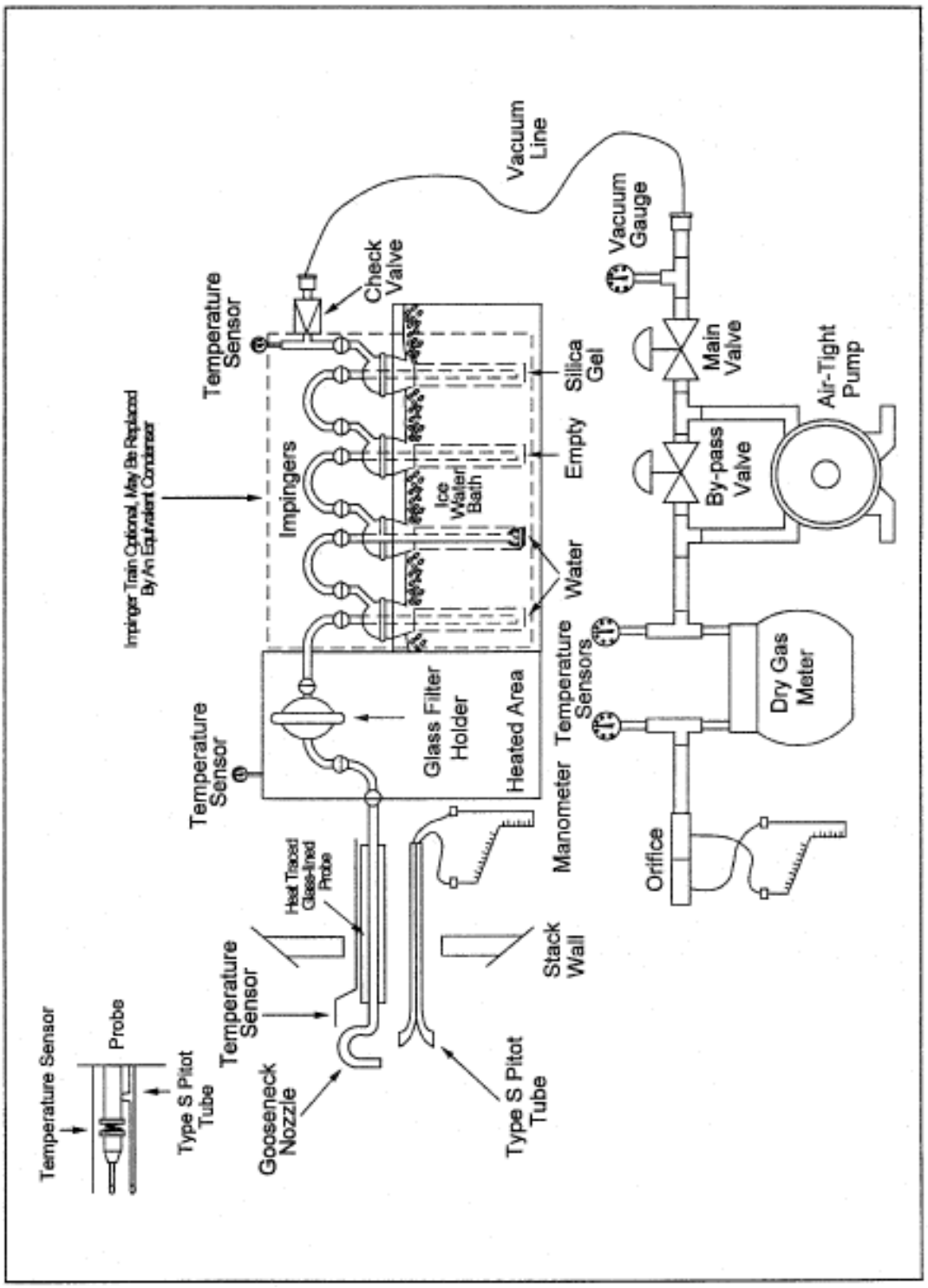
Date:_____
Observer:_____

Observer Checklist – Reference Method 5 - Particulate Matter Emissions (continued)

If the answer is NO to any questions, provide comments below.		YES	NO
§8.7.1	After the probe has cooled and safe to handle, was any external PM wiped off the nozzle and then the nozzle capped to prevent losing or gaining PM?		
§8.7.5	Was an acetone blank collected?		
§8.7.6	Any abnormal conditions noted during inspection of sample train prior to and during disassembly?		
§8.7.6.1	Container 1. Was the filter carefully transferred into a petri dish?		
§8.7.6.2	Container 2. Was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed?		
§8.7.6.3	Container 3. Is the silica gel in good condition? Note the color of the silica gel to determine if it is spent.		
§8.7.6.4	Was the moisture content for the test run determined using the impingers' weight gain?		
§10.1	Is the nozzle free of nicks, dents, or corrosion?		
§10.2	Are the pitot tubes free of nicks, dents, or corrosion?		

Comments:

Figure M5-1. Particulate Sampling Train



Date:_____
Observer:_____

Observer Checklist – Methods 3A, 6C, 7E, or 10

Facility Name / Location :			
Facility Contact / Phone :			
Testing Firm / Contact :			
Permit #:			
Source Tested:			
Applicable Regulation(s) / Pollutant(s) :			
Process Data / Production Rate :			
Instrumental Methods: 3A-O_2/CO_2, 6C SO_2, 7E-NO_x, and 10-CO (circle method(s))		YES	NO
Citations are for Method 7E			
If the answer is NO to any questions, provide comment below and see Figure CEMS-2			
§8.1	Were the sample point(s) determined correctly?		
§8.2.1	Are the calibration gas certificates current?		
§8.2.1	Are the calibration gases within acceptable ranges?		
§8.2.2	Is the sampling system properly configured? (See CEMS-1)		
§8.2.3	Is the 3-pt direct calibration error (CE) (or 3-pt system CE for dilution systems) within ±2.0% of the calibration span or ≤0.5 ppmv absolute difference?		
§8.2.4	**Method 7E only**. Was the NO_2 to NO conversion efficiency test preformed? Was it >90%?		
§8.2.5	Is the initial system bias check (or pre and post 2-pt CE for dilution systems) within ±5.0% of calibration span or ≤0.5 ppmv absolute difference?		
§8.2.6	What is the system response time? Response time:		
§8.2.7	Was interference test paperwork available and representative?		

Date:_____
Observer:_____

Observer Checklist – Methods 3A, 6C, 7E, or 10 (continued)

If the answer is NO to any questions, provide comment below and see Figure Instrumental Methods-2		YES	NO
§8.3	**Dilution system only**. Is the diluted sample dew point below the sample line and analyzer temperatures?		
§8.3	**Dilution system only**. Is the dilution ratio consistent through the test runs?		
§8.3	**Dilution system only**. Are the molecular weights (MW) of the calibration and stack gases addressed in dilution ratio and measurement calculations?		
§8.5	Was the post-run system bias check (or 2-pt system CE for dilution systems) within ±5.0% of calibration span or ≤0.5 ppmv absolute difference?		
§8.5	Was the post-run system drift check within ±3.0% of calibration span or ≤0.5 ppmv absolute difference?		
§8.6	Was dynamic spiking procedure used?		

Comments:

Figure CEMS-1. Example of equipment configuration.

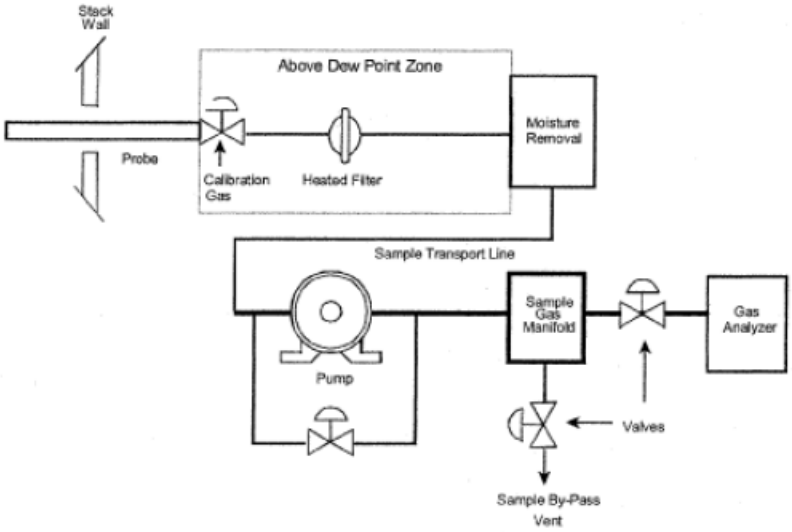
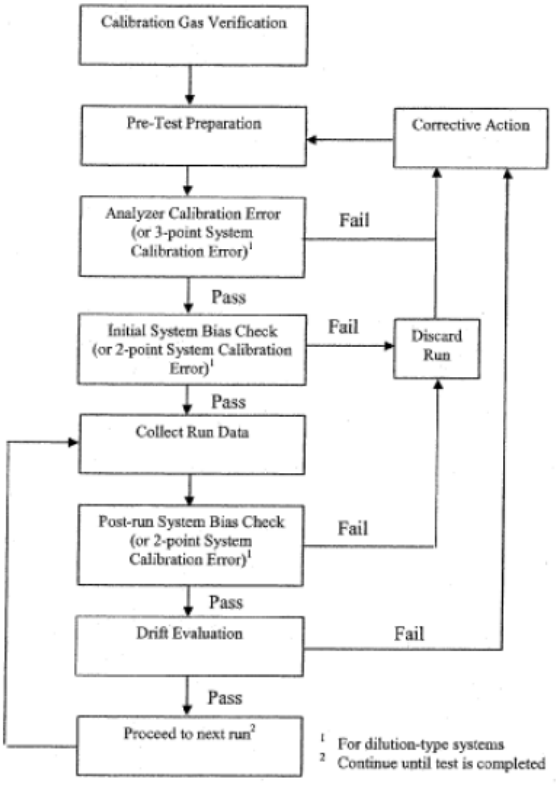


Figure CEMS-2. Test Run Calibration Flow Chart



Date:_____
Observer:_____

Observer Checklist – Method 29 – Metals Emissions

Facility Name / Location :	
Facility Contact / Phone :	
Testing Firm / Contact :	
Permit #:	
Source Tested:	
Applicable Regulation(s) / Pollutant(s) :	
Process Data / Production Rate :	

Method 29 – Metal Emissions from Stationary Sources		YES	NO
If the answer is NO to any questions, provide comment below.			
§8.1.3	Was the sampling train set up correctly? (see Figure M29-1)		
§8.1.4	Did the sampling train pre-test leak check pass? (optional) Leak rate:		
§8.1.4	Did the sampling train post-test leak check pass? (mandatory) Leak rate:		
§8.1.5	Was the temperature of the gas flow through the filter during the run at 120 ± 14 °C (248 ± 25 °F)?		
§8.1.5	For a stack with significant negative pressure, sampling pumps can be started prior to going into the stack.		
§8.1.5	Is the port properly sealed around the sample probe?		
§8.1.5	Is the sampling train being traversed per Method 1?		
§8.1.5	Is the temperature of the gas exiting the sampling train <20 °C (68° F)?		
§8.1.5	Was the test run completed without changing out the filter?		
§8.1.5	Was the test run completed without changing out the sampling train?		
§8.1.6	Was the sampling train operated isokinetically (100 ± 10%)?		

Date:_____
Observer:_____

Observer Checklist – Method 29 – Metals Emissions (continued)

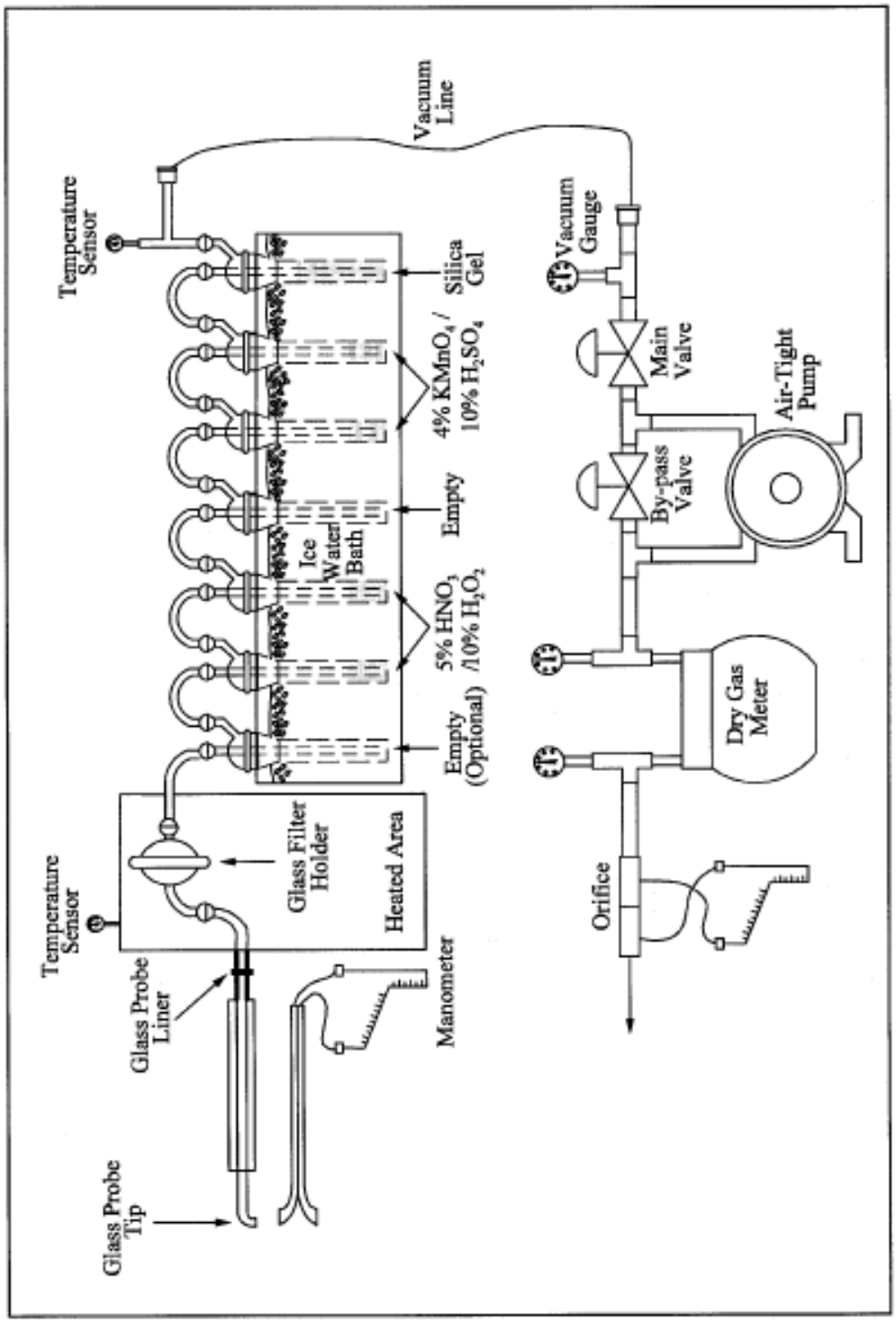
If the answer is NO to any questions, provide comment below.		YES	NO
§8.2.5	Container 1. Was the filter carefully transferred into a petri dish?		
§8.2.6	Container 2. If PM is being measured, was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls of acetone?		
§8.2.7	Container 3. Was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls 0.1N HNO_3?		
§8.2.8	Container 4. Were impingers 1 through 3 weighed and then emptied into container 4?		
§8.2.8	Was the moisture content for the test run determined using the impingers' weight gain?		
§8.2.8	Container 4. Was the back half of the filter holder and all glassware through impinger 3 rinsed with 100mls 0.1N HNO_3?		
§8.2.9.1	Container 5A. If mercury (Hg) is being measured, was impinger 4 weighed and emptied into container 5A?		
§8.2.9.1	Container 5A. If Hg is being measured, was impinger 4 rinsed with 100mls of 0.1N HNO_3?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6 weighed and emptied into container 5B?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6, and the connecting glassware triple rinsed with 100mls of fresh acidified $KMnO_4$ solution followed with 100mls of reagent grade H_2O?		
§8.2.9.3	Container 5C. If Hg is being measured, were impingers 5 and 6 rinsed the 8N HCl?		
§8.2.10	Container 6. Was the silica gel impinger weighed and in good condition?		
§8.2.11	Container 7. If PM is being measured, was a 100ml acetone blank taken?		
§8.2.12	Container 8A. Was a 300ml 0.1N HNO_3 blank taken?		
§8.2.13	Container 8B. Was a 100ml reagent water blank taken?		
§8.2.14	Container 9. Was a 200ml 5% HNO_3/10% H_2O_2 blank taken?		
§8.2.15	Container 10. If Hg is being measured, was a 100ml acidified $KMnO_4$ solution blank taken?		
§8.2.16	Container 11. If Hg is being measured, was a 25ml 8N HCl blank in 200ml of reagent H_2O taken?		
§8.2.17	Container 12. Was a filter blank taken?		
§10.1	Is the nozzle free of nicks, dents, or corrosion?		
§10.1	Are the pitot tubes free of nicks, dents, or corrosion?		

Date:_____
Observer:_____

Observer Checklist – Method 29 – Metals Emissions (continued)

Comments:

Figure M29-1. Metals Sampling Train.



Observer Checklist – Emission Test Report Checklist

Facility Name / Location :				
Facility Contact / Phone :				
Testing Firm / Contact :				
Permit #:				
Source Tested:				
Applicable Regulation(s) / Pollutant(s) :				
Emissions Test Report Checklist			YES	NO
If the answer is NO to any questions below, provide comment below.				
1.0 Introduction	1.1 Summary of Test Program	Responsible groups (participating organizations)		
		Overall purpose of the emission test		
		Applicable regulations		
		Industry		
		Name of facility		
		Facility location		
		Processes of interest		
		Air pollution control equipment, if applicable		
		Emission points and sampling locations		
		Pollutants to be measured and testing methods used		
		Dates of emission testing		
	1.2 Key Personnel	Names, affiliations, and telephone numbers of key personnel		

Observer Checklist – Emission Test Report Checklist (continued)

If the answer is NO to any questions below, provide comment below.			YES	NO
2.0 Plant and Sampling Location Description	2.1 Process Description and Operation	General description of the basic process		
		Flow diagram (indicate emission and process test points)		
		Discussion of typical process operations, such as: • Production rates; • Feed material and feed rates or batch size; • Equipment sizes and capacities (rates); and • Production schedules (hours/day, days/week, peak periods).		
	2.2 Control Equipment Description	Description of all air pollution control systems, if applicable		
		Discussion of typical control equipment operation and, if necessary, a schematic.		
		Discussion on parameter(s) monitored and monitoring results for parameters for which operating limits will be set		

Observer Checklist – Emission Test Report Checklist (continued)

If the answer is NO to any questions below, provide comment below.			YES	NO

2.0 Plant and Sampling Location Description	2.3 Flue Gas Sampling Location	Provide a schematic of each location. Include:
		• Duct diameter;
		• Direction of flow;
		• Dimension (include number of duct diameters);
		  • Location and configuration of sampling ports
		  • Nipple length and port diameters
		  • Number and configuration of traverse points
		• Confirm that the sampling location met the EPA Method 1 criteria – If not, give reasons and discuss effect on results; and
		• Discuss any special traversing or measurement schemes.		

	2.4 Process Sampling Location	If process stream samples were taken, include the following:
		• Schematic of location, if helpful;
		• Description of each sampling or measurement location;
		  • Description of procedure used to obtain samples or measurements
		  • Discussion on the representativeness of each of the process stream sampling locations and samples.		

Observer Checklist – Emission Test Report Checklist (continued)

If the answer is NO to any questions below, provide comment below.			YES	NO
3.0 Summary and Discussion of Test Results	3.1 Objectives and Test Matrix	Restate the overall purpose of the test program.		
		List the specific objectives.		
		Include a test matrix table showing the following (including schematics, if helpful): • Run number and date; • Sample type/pollutant; • Test method; • Sampling locations; • Clock time; and • Sampling time.		
	3.2 Field Test Changes and Problems	List and discussion of any changes in sampling and analytical methods for emissions or process information.		
	3.3 Presentation of Results	Address each of the specific objectives and present a summary of the results in tabular form. • Compare field data sheets with report tables, • Compare lab data with report tables, • Check report calculations		
		Discuss data.		
4.0 Sampling and Analytical Procedures	4.1 Test Methods	Schematic of each sampling train		
		Flow diagram of the sample recovery		
		Flow diagram of the sample analysis		
		Description of any modifications		
		Discussion of any problematic sampling or analytical conditions		
	4.2 Process Test Methods	Description of procedures used to obtain process stream samples, process data, and control equipment data		
		Calibration procedures for any test equipment, if appropriate.		

Observer Checklist – Emission Test Report Checklist (continued)

If the answer is NO to any questions below, provide comment below.			YES	NO
5.0 Internal QA/QC Activities	5.1 QA/QC Problems	QA/QC problems that occurred during the test.		
		Sample identification and custody problems		

	5.2 QA Audits	For each of the test methods for which an audit was conducted, list (if applicable) the following:
		• Type of audit;
		• Limits of acceptability;
		• Supplier of audit material;
		• Audit procedure; and
		• Summary of results
		  ○ Calibrations
		  ○ Analytical QC
		  ○ Sampling QC		

Appendices		Required information from the General Provision, §60.8(f)(2)(v) but not limited to:
		• Test run raw data sheets;
		• Instrumental method data;
		  ○ Instrument calibration(s)
		  ○ QC checks
		  ○ Certificate of analysis
		• Equipment calibration
		• Sample calculations;
		• Process data; and
		• Analytical data
		  ○ Record of standard preparation
		  ○ Raw data sheets
		  ○ Chain-of-custody documentation		

Comments: