

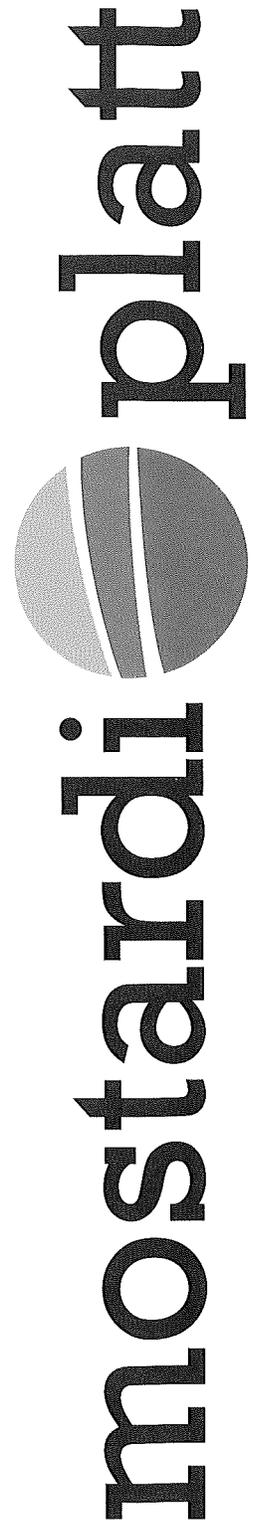
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**Mercury and Air Toxics
Standard Particulate
Matter and Hydrogen
Chloride Emissions
Test Report**

Lansing Board of Water and Light
Erickson Station
Unit 1 Stack
Lansing, Michigan
Project No. M223207A
September 9, 2022



BH001-test-20220909



**Mercury and Air Toxics Standard Particulate Matter and
Hydrogen Chloride Emissions Test Report**

**Lansing Board of Water and Light
Erickson Station
Unit 1 Stack
Lansing, Michigan
September 9, 2022**

**Report Submittal Date
October 11, 2022**

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Project No. M223207A

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1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a Mercury and Air Toxics Standards (MATS) filterable particulate matter and hydrogen chloride emissions test program for the Lansing Board of Water and Light at the Erickson Station on the Unit 1 Stack in Lansing, Michigan on September 9, 2022. This report summarizes the results of the test program and test methods used.

The test location, test date, and test parameters are summarized below.

TEST INFORMATION		
Test Location	Test Dates	Test Parameters
Unit 1 Stack	September 9, 2022	Filterable Particulate Matter (FPM) and Hydrogen Chloride (HCl)

The purpose of the test program was to document FPM and HCl emissions to qualify for the LEE designation as required by 40 CFR Part 63, Subpart UUUUU. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS				
Test Location	Test Parameter	Emission Limits	LEE Emission Limits	Emission Rates
Unit 1 Stack	FPM	≤0.030 lb/mmBtu	≤0.015 lb/mmBtu	0.0015 lb/mmBtu
	HCl	≤0.002 lb/mmBtu	≤0.001 lb/mmBtu	0.0011 lb/mmBtu

Emissions on lb/mmBtu basis were determined using a standard F_d-Factor of 9,820 dscf/mmBtu for sub-bituminous coal. Plant operating data as provided by Lansing Board of Water and Light is included in Appendix A.

The identifications of the individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	Address	Contact
Test Coordinator	Lansing Board of Water and Light 1201 S. Washington Ave. Lansing, Michigan 48910	Nathan Hude Environmental Regulatory Compliance – Air (517) 705-6170 (phone) Nathan.hude@lbwl.com
Test Facility	Lansing Board of Water and Light Erickson Station 3725 S. Canal Road Lansing, Michigan 48917	
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Stuart Burton Project Manager 630-993-2100 (phone) sburton@mp-mail.com

The test crew consisted of C. Buglio, K. Beckham, T. Long, T. Yanowsky, and S Burton of Mostardi Platt.

2.0 TEST METHODOLOGY

Emissions testing was conducted following the methods specified in 40CFR60, Appendix A. A schematic of the test section diagram is found in Appendix B and schematics of the sampling trains used are included in Appendix C. Calculation nomenclature and sample calculations are included in Appendix D. Laboratory analysis data are found in Appendix E. Copies of analyzer print-outs for each test run are included in Appendix F and field data sheets are found in Appendix G.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION				
Location	Upstream Diameters	Downstream Diameters	Test Parameter	Number of Sampling Points
Unit 1 Stack	7.9	11.8	FPM, HCl	12

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate. An S-type pitot tube, differential pressure gauge, thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 3A Oxygen (O₂)/Carbon Dioxide (CO₂) Determination

Stack gas molecular weight was determined in accordance with Method 3A. An ECOM analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H and copies of the gas cylinder certifications are found in Appendix I.

Method 5 Filterable Particulate Matter (FPM) Determination

Stack gas FPM concentrations and emission rates were determined in accordance with USEPA Method 5, 40CFR60, Appendix A. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method. Filter and probe temperatures were elevated to 320° Fahrenheit as described in 40CFR63, Subpart UUUUU. Particulate matter in the sample probe was recovered using an acetone rinse. The probe wash and filter catch were analyzed by Mostardi Platt in accordance with the Method in the Elmhurst, Illinois laboratory. Sample analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 26A Hydrogen Chloride (HCl) Determination

Stack gas HCl concentrations and emission rates were determined in accordance with Method 26A, 40CFR60, Appendix A. An Environmental Supply Company sampling train was used to sample stack gas, in the manner specified in the Method. Analyses of the samples collected were conducted at the Elmhurst, Illinois laboratory of Mostardi Platt. Sample analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

3.0 TEST RESULT SUMMARIES

Client: Lansing Board of Water and Light
Facility: Erickson Station
Test Location: Unit 1 Stack
Test Method: 5 MATS

	Source Condition	Normal	Normal	Normal	
	Date	9/9/22	9/9/22	9/9/22	
	Start Time	7:10	9:35	12:00	
	End Time	9:23	11:47	14:12	
	Run 1	Run 2	Run 3	Average	
Stack Conditions					
Average Gas Temperature, °F	300.9	301.0	301.0	301.0	301.0
Flue Gas Moisture, percent by volume	9.5%	11.2%	10.9%	10.9%	10.5%
Average Flue Pressure, in. Hg	28.85	28.85	28.85	28.85	28.85
Gas Sample Volume, dscf	80.423	80.644	80.582	80.582	80.550
Average Gas Velocity, ft/sec	35.432	35.726	35.651	35.651	35.603
Gas Volumetric Flow Rate, acfm	482,544	486,542	485,530	485,530	484,872
Gas Volumetric Flow Rate, dscfm	292,322	288,966	289,300	289,300	290,196
Gas Volumetric Flow Rate, scfm	322,882	325,521	324,844	324,844	324,416
Average %CO ₂ by volume, dry basis	12.4	12.5	12.5	12.5	12.5
Average %O ₂ by volume, dry basis	7.2	7.2	7.1	7.1	7.2
Isokinetic Variance	100.0	101.4	101.2	101.2	100.9
Standard Fuel Factor Fd, dscf/mmBtu	9,820.0	9,820.0	9,820.0	9,820.0	9,820.0
Filterable Particulate Matter (Method 5 MATS)					
grams collected	0.00482	0.00305	0.00302	0.00302	0.00363
mg/dscm	2.117	1.336	1.324	1.324	1.592
mg/wscm	1.915	1.186	1.179	1.179	1.427
grains/acf	0.0006	0.0003	0.0003	0.0003	0.0004
grains/dscf	0.0009	0.0006	0.0006	0.0006	0.0007
lb/hr	2.317	1.445	1.434	1.434	1.732
lb/mmBtu (Standard Fd Factor)	0.0020	0.0012	0.0012	0.0012	0.0015

Client: Lansing Board of Water and Light
 Facility: Erickson Station
 Test Location: Unit 1 Stack
 Test Method: 26A MATS

Source Condition	Normal	Normal	Normal	
Date	9/9/22	9/9/22	9/9/22	
Start Time	7:10	9:23	11:33	
End Time	8:59	11:12	13:23	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	300.3	300.7	300.8	300.6
Flue Gas Moisture, percent by volume	11.3%	11.9%	11.8%	11.7%
Average Flue Pressure, in. Hg	28.80	28.80	28.80	28.80
Gas Sample Volume, dscf	64.387	64.718	65.026	64.710
Average Gas Velocity, ft/sec	35.258	35.468	35.577	35.434
Gas Volumetric Flow Rate, acfm	480,176	483,026	484,518	482,573
Gas Volumetric Flow Rate, dscfm	284,798	284,288	285,464	284,850
Gas Volumetric Flow Rate, scfm	320,986	322,750	323,676	322,471
Average %CO ₂ by volume, dry basis	12.4	12.5	12.5	12.5
Average %O ₂ by volume, dry basis	7.2	7.2	7.1	7.2
Isokinetic Variance	101.4	102.1	102.2	101.9
Standard Fuel Factor Fd, dscf/mmBtu	9,820.0	9,820.0	9,820.0	9,820.0
Hydrogen Chloride (HCl) Emissions				
ug of sample collected	2032.00	2116.00	2119.00	2089.00
ppm	0.74	0.76	0.76	0.75
mg/dscm	1.11	1.15	1.15	1.14
lb/hr	1.189	1.230	1.231	1.216
lb/mmBtu (Standard Fd Factor)	0.0010	0.0011	0.0011	0.0011

4.0 CERTIFICATION

Mostardi Platt is pleased to have been of service to Lansing Board of Water and Light. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

As project manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results, and the test program was performed in accordance with the methods specified in this test report.

MOSTARDI PLATT



Stuart L. Burton

Program Manager



Scott W. Banach

Quality Assurance

APPENDICES

Appendix A - Plant Operating Data

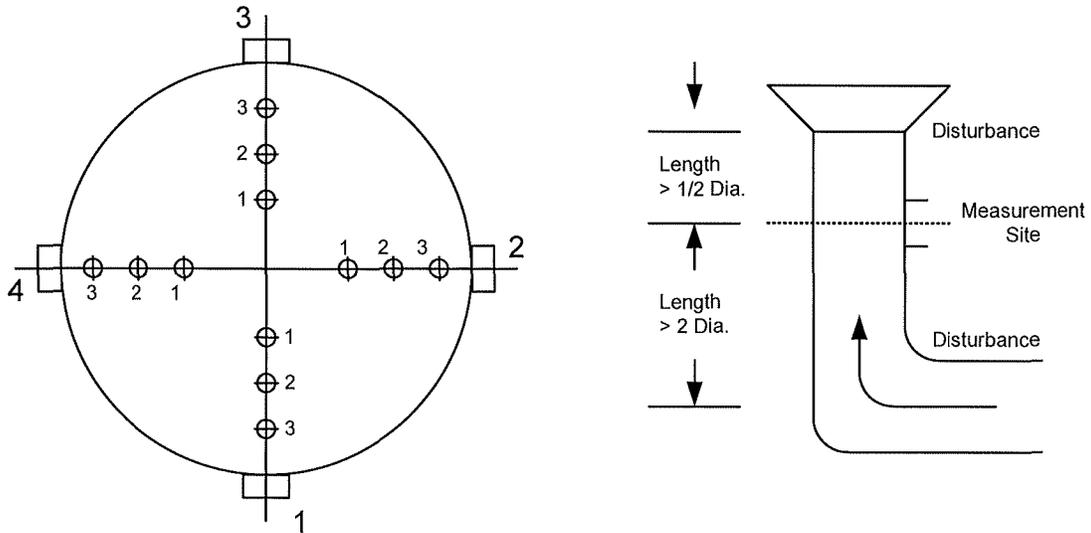
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MATS Report CEMS Data

Date/Time	UNIT01 HEATIN Value	UNIT01 MW Value
09/09/2022 07:00	1239.9	99
09/09/2022 07:15	1224.8	99
09/09/2022 07:30	1238.5	99
09/09/2022 07:45	1233.7	99
09/09/2022 08:00	1232.6	99
09/09/2022 08:15	1225.9	99
09/09/2022 08:30	1229	99
09/09/2022 08:45	1228.9	99
09/09/2022 09:00	1235.4	99
09/09/2022 09:15	1227.4	99
09/09/2022 09:30	1227.6	99
09/09/2022 09:45	1243.6	99
09/09/2022 10:00	1241	99
09/09/2022 10:15	1242.3	99
09/09/2022 10:30	1244.5	99
09/09/2022 10:45	1246.9	99
09/09/2022 11:00	1244.8	99
09/09/2022 11:15	1244	99
09/09/2022 11:30	1256.4	99
09/09/2022 11:45	1254.3	99
09/09/2022 12:00	1240.2	99
09/09/2022 12:15	1246	99
09/09/2022 12:30	1237.8	99
09/09/2022 12:45	1248.9	99
09/09/2022 13:00	1248.6	99
09/09/2022 13:15	1241.7	99
09/09/2022 13:30	1228.5	99
09/09/2022 13:45	1231	99
09/09/2022 14:00	1227.9	99
09/09/2022 14:15	1226.5	99

Appendix B - Test Section Diagram

EQUAL AREA TRAVERSE FOR ROUND DUCTS



Job: Lansing Board of Water and Light
Erickson Station
Lansing, Michigan

Date: September 9, 2022

Test Location: Unit 1 Stack

Stack Diameter: 17.0 feet

Stack Area: 226.980 feet squared

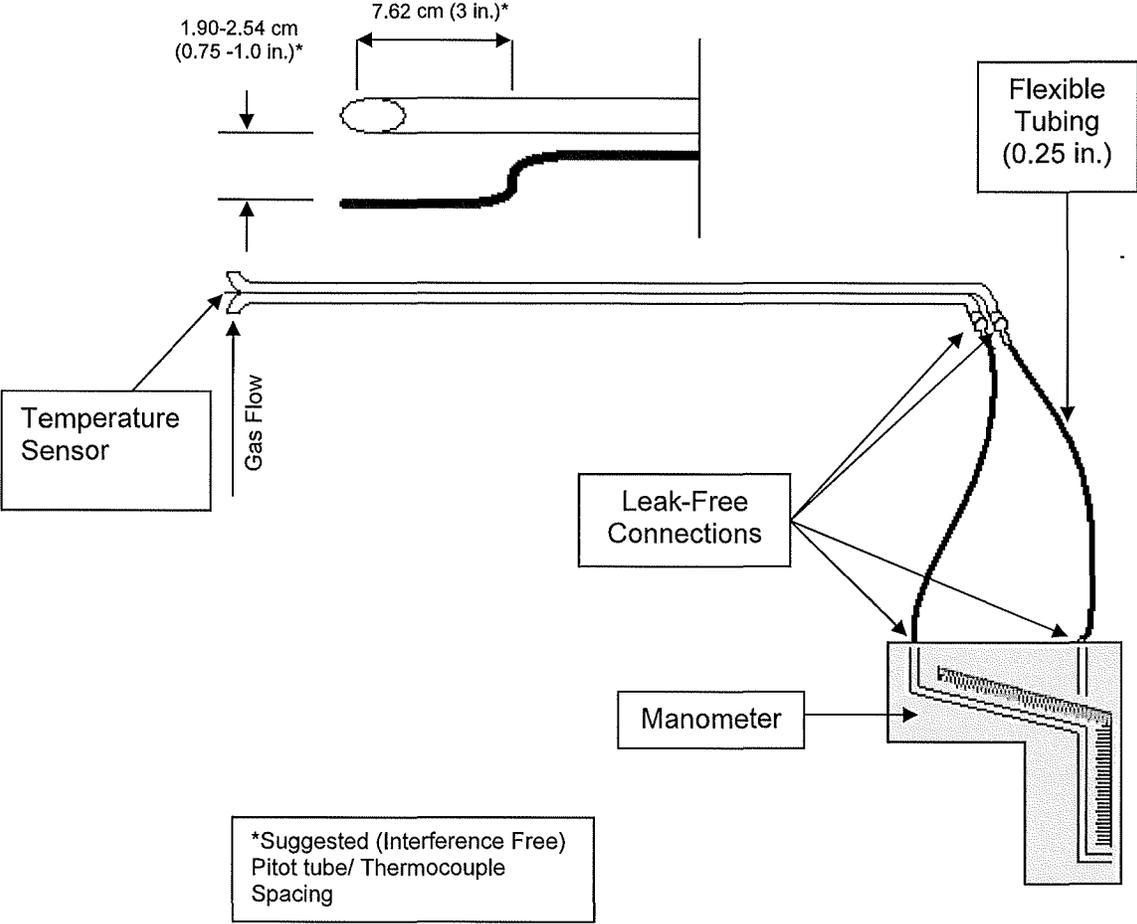
No. Points Across Diameter: 3

No. of Ports: 4

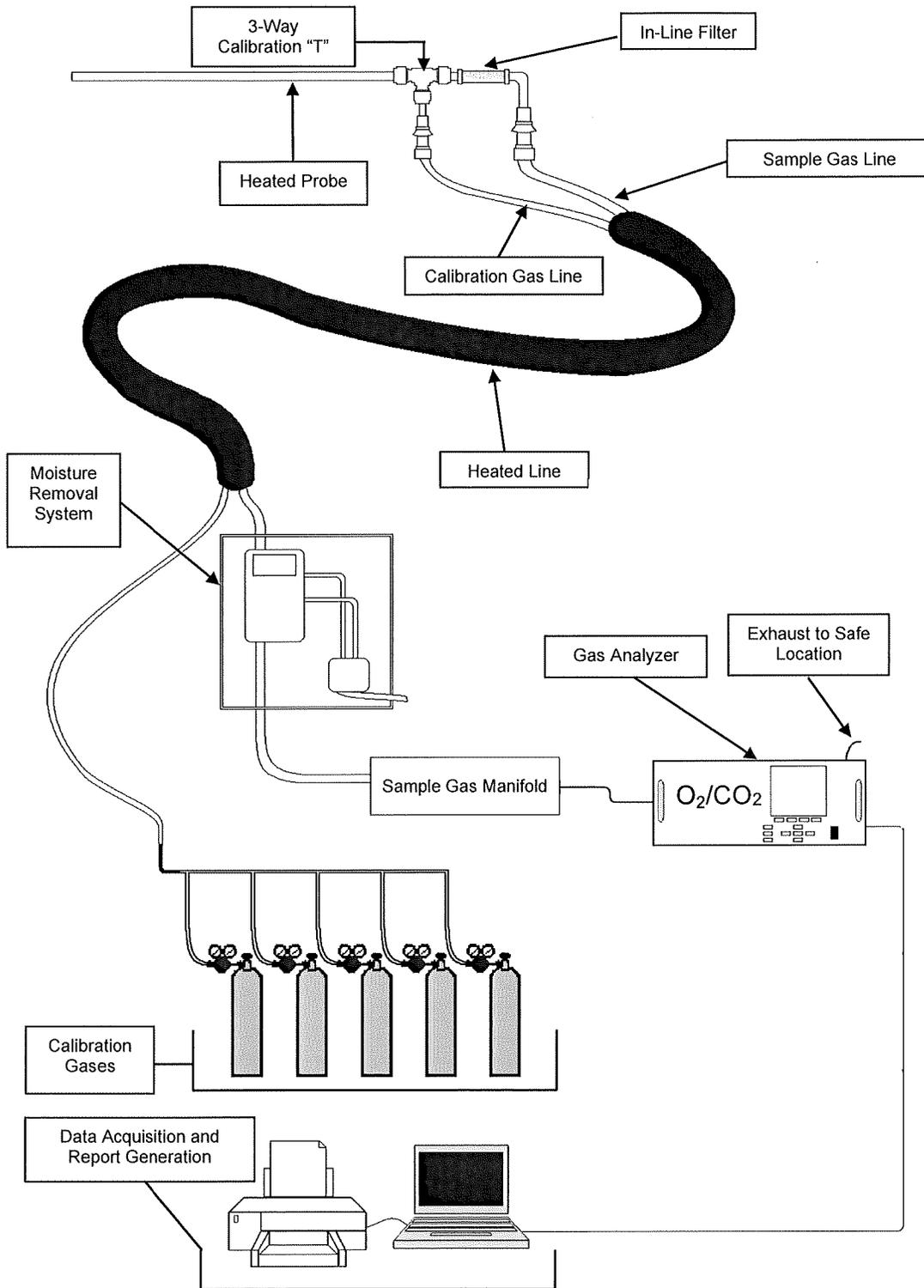
Port Length: 78 inches

Appendix C - Sample Train Diagrams

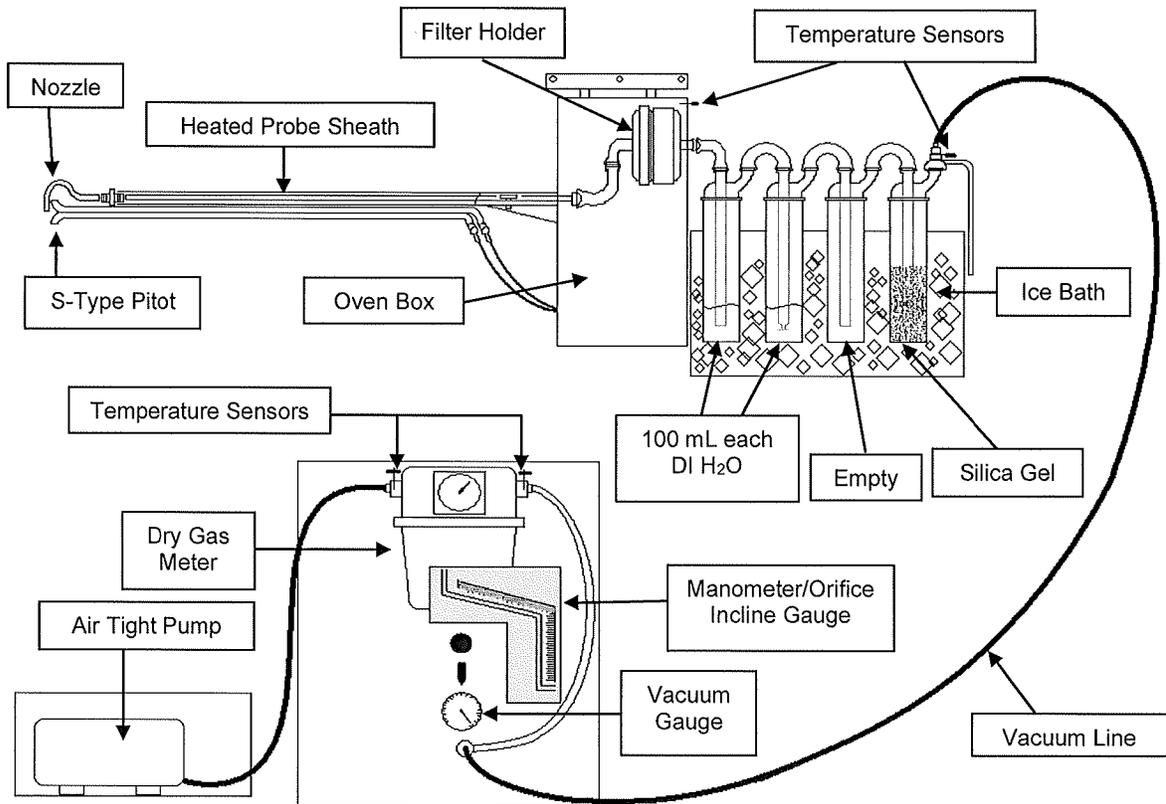
USEPA Method 2 – Type S Pitot Tube Manometer Assembly



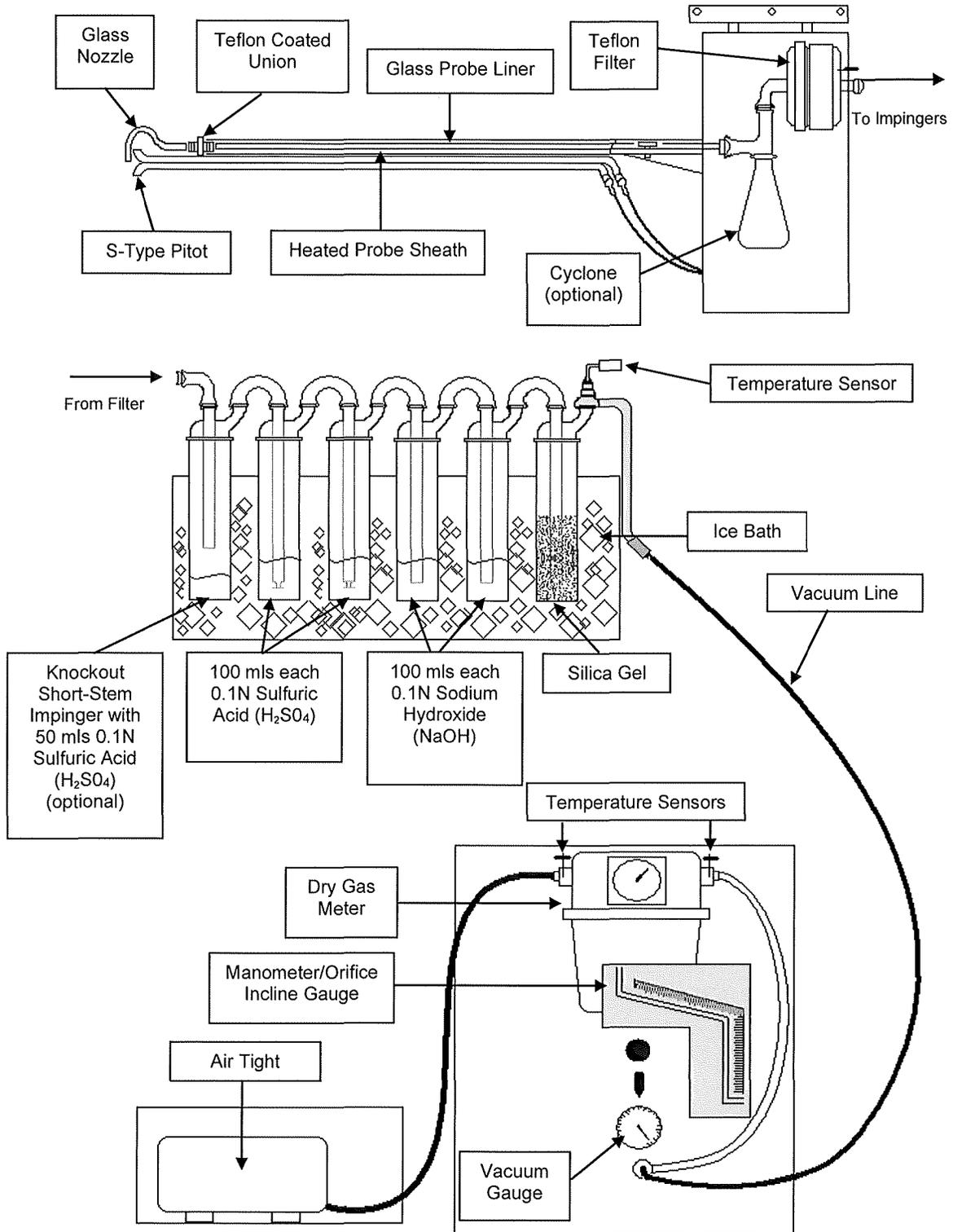
USEPA Method 3A Extractive Gaseous Sampling Diagram



USEPA Method 5- Particulate Matter Sample Train Diagram



USEPA Method 26A – HCl and HF Sample Train Diagram



Appendix D - Calculation Nomenclature and Formulas