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Compliance Emissions Test Report

Specialty Minerals, Inc.
Three Carbonators Common Stack
Iron Mountain, Michigan
Project No. M221801
May 5, 2022

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Iron Mountain, Michigan
May 5, 2022

Report Submittal Date
June 14, 2022

Project No. M221801

Corporate Headquarters
888 Industrial Drive
Elmhurst, Illinois 60126
630-993-2100

Crown Point, IN | Mendota Heights, MN | Denver, CO | Henderson, NV

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1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a compliance emissions test program for Specialty Minerals, Inc. on May 5, 2022 on the Three Carbonators Common Stack in Iron Mountain, Michigan. 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 PARAMETERS		
Test Location	**Test Date**	**Test Parameters**
Three Carbonators Common Stack	May 5, 2022	Nitrogen Oxides (NO_X), Carbon Dioxide (CO_2), Oxygen (O_2), Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs)

The purpose of the test program was to evaluate the emissions to satisfy the regulatory requirements of the operating permit. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

REQUIRED TEST RESULTS AND EMISSION LIMITS				
Test Location	**Test Date**	**Test Parameter**	**Emission Limit**	**Emission Rate**
Three Carbonators Common Stack	5/5/2022	NO_X	387.5 ppmvd @ 4% O_2	88.4 ppmvd @ 4% O_2
			39.6 pph	7.0 pph
		CO	524 ppmvd @ 4% O_2	27.1 ppmvd @ 4% O_2
			32.6 pph	1.3 pph
		VOC	148.5 ppmvd @ 4% O_2	9.55 ppmvd @ 4% O_2
			5.28 pph	0.70 pph

Operating data as provided by Specialty Minerals, Inc. 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 Facility	Specialty Minerals, Inc. P.O. Box 1047 Iron Mountain, Michigan 49801	Ms. Terri Rose Plant Assistant (906) 779-9138 (phone) Terri.Rose@Mineralstech.com
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Jacob Howe Project Manager (630) 993-2100 (phone) jhowe@mp-mail.com

The test crew consisted of Messrs. J. Jimenez, T. Long, and J. Howe of Mostardi Platt.

2.0 TEST METHODOLOGY

Emission testing was conducted following the methods specified in 40 CFR, Part 60, Appendix A. Schematics of the test section diagrams and sampling trains used are included in Appendix B and C, respectively. Calculation examples and nomenclature are included in Appendix D. Copies of analyzer print-outs and field data sheets for each test run are included in Appendix E and F, respectively.

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	Diameter (Feet)	Area (Square Feet)	Upstream Diameters	Downstream Diameters	Test Parameter	Number of Sampling Points
Three Carbonators Common Stack	3.0	530.93	>0.5	>2.0	Volumetric Flow	16

Gaseous Sampling Plan

Three sample points at 17%, 50%, and 83% of the stack diameter were used for gaseous sampling.

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate. S-type pitot tubes, differential pressure gauges, thermocouples and temperature readouts were used to determine gas velocity at each sample point at each test location. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix G.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A. A Servomex analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. The equipment used was calibrated in accordance with the specifications of the Method and calibration data are included in Appendix G. Copies of the gas cylinder certifications are included in Appendix H.

Method 4 Moisture Determination

USEPA Method 4, 40CFR60, Appendix A, was utilized to determine water (H2O) content of the exhaust gas. 100 milliliters (ml) of water were added to each of the first two impingers, the third impinger was left empty, and the fourth impinger was charged with approximately 200 grams of silica gel. The impingers were placed in an ice bath to maintain the sampled gas passed through the silica gel impinger outlet below 68°F in order to increase the accuracy of the sampled dry gas volume measurement. The water volumes of the impinger train were measured and the silica gel was weighed before and after each test run to determine the mass of moisture condensed.

Each sample was extracted through a heated stainless-steel probe and filter assembly at a constant sample rate of approximately 0.75 cubic feet per minute, which was maintained throughout the course of the test run. A minimum of 21 dry standard cubic feet (dscf) are sampled for each moisture run. After each run, a leak check of the sampling train was performed at a vacuum greater than the sampling vacuum to determine if any leakage had occurred during sampling. Following the leak check, the impingers were removed from the ice bath, water levels were measured, and the silica gel weight was recorded.

All of the equipment used was calibrated in accordance with the specifications of the Method. Copies of field data sheets are included in Appendix H. Calibration data is presented in Appendix I. This testing met the performance specifications as outlined in the Method.

Method 7E Nitrogen Oxide (NO_X) Determination

Stack gas nitrogen oxide concentrations and emission rates were determined in accordance with Method 7E. A Thermo Scientific 42i nitrogen oxide analyzer was used to determine nitrogen oxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks can be found in Appendix G. Copies of calibration gas certifications can be found in Appendix H.

Method 10 Carbon Monoxide (CO) Determination

Stack gas carbon monoxide concentrations and emission rates were determined in accordance with Method 10. A Thermo Fisher 48C carbon monoxide analyzer was used to determine carbon monoxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks can be found in Appendix G. Copies of calibration gas certifications can be found in Appendix H.

Method 25A Volatile Organic Compound (VOC) Determination

Total hydrocarbons (THC) concentrations and emission rates were determined in accordance with Method 25A. A VIG Model 20 was used to determine THC concentrations. Stack gas was delivered to the system via a Teflon® sampling line, heated to a minimum temperature of 300°F.

The system was calibrated before and after each test run using certified calibration gases of propane for the THC determination. Calibration data are presented in Appendix G, field sheets are presented in Appendix F, and copies of gas certifications are presented in Appendix H.

3.0 TEST RESULT SUMMARY

Specialty Minerals, Inc.
Iron Mountain, MI
Three Carbonators Common Stack
Gaseous Summary

Test No.	Date	Start Time	End Time	NO_x ppmvd	CO ppmvd	SO_2 ppmvd	CO_2 % (dry)	O_2 % (dry)	THC ppm as C_3H_8 (wet)	Moisture, %	THC ppm as C_3H_8 (dry)	Flowrate, DSCFM	Flowrate, SCFM
1	05/05/22	08:05	09:09	83.5	22.6	0.6	5.5	4.7	5.9	13.7	6.8	12,858	14,898
2	05/05/22	09:40	11:54	76.9	24.3	0.3	9.0	6.4	6.7	20.2	8.4	11,777	14,179
3	05/05/22	12:25	14:02	77.6	25.8	0.4	9.5	6.1	8.2	20.2	10.3	12,118	15,185
Average				79.3	24.2	0.4	8.0	5.7	6.9	18.0	8.5	12,251	14,754

Emission Rate Summary

Test No.	Date	Start Time	End Time	NO_x ppmvd @ 4% O2	CO ppmvd @ 4% O2	SO_2 ppmvd @ 4% O2	THC ppm as C_3H_8 (dry) @ 4% O2	NO_x lb/hr	SO_2 lb/hr	CO lb/hr	THC lb/hr as C3H8
1	05/05/22	08:05	09:09	87.1	23.6	0.63	7.13	7.7	0.08	1.3	0.60
2	05/05/22	09:40	11:54	89.6	28.3	0.35	9.79	6.5	0.04	1.3	0.65
3	05/05/22	12:25	14:02	88.6	29.5	0.46	11.73	6.7	0.05	1.4	0.85
Average				88.4	27.1	0.48	9.55	7.0	0.06	1.3	0.70

Emisssion Limits

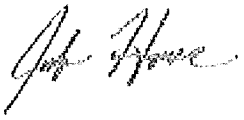
NO_x ppmvd @ 4% O2	387.5
NOx lb/hr	39.6
CO ppmvd @ 4% O2	524
CO lb/hr	32.6
VOC ppmvd @ 4% O2	148.5
VOC lb/hr	5.28

4.0 CERTIFICATION

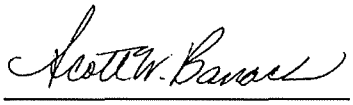
Mostardi Platt is pleased to have been of service to Specialty Minerals, Inc. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

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



Jacob Howe — Program Manager



Scott W. Banach — Quality Assurance

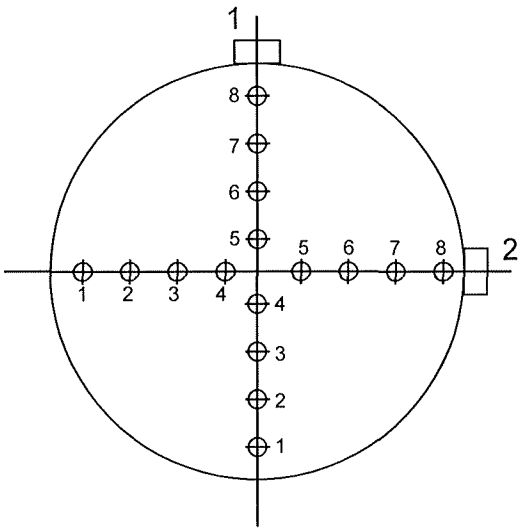
APPENDICES

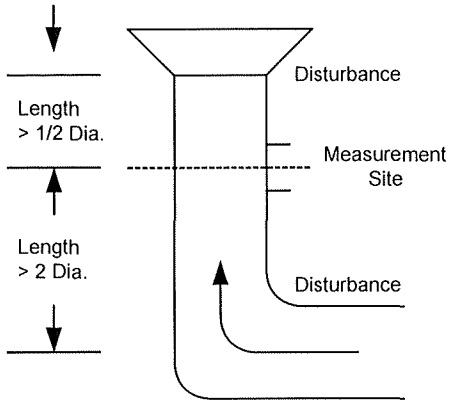
Appendix A - Plant Operating Data

Carb Batches	9-10am	10-11am	11am-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm
Carb 1									
Run 1 Start/Stop			1102am	1244pm					
Run 2 Start/Stop					137pm		320pm		
Run 3 Start/Stop							328pm		519pm
Carb 2									
Run 1 Start/Stop			1103am	1257pm					
Run 2 Start/Stop					136pm		330pm		
Run 3 Start/Stop							351pm		545pm
Carb 3									
Run 1 Start/Stop			1104am		105pm				
Run 2 Start/Stop					134pm		331pm		
Run 3 Start/Stop								410pm	543pm

Appendix B - Test Section Diagrams

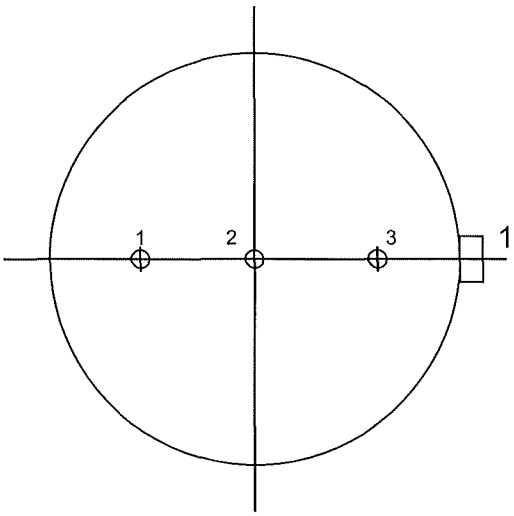
EQUAL AREA TRAVERSE FOR ROUND DUCTS

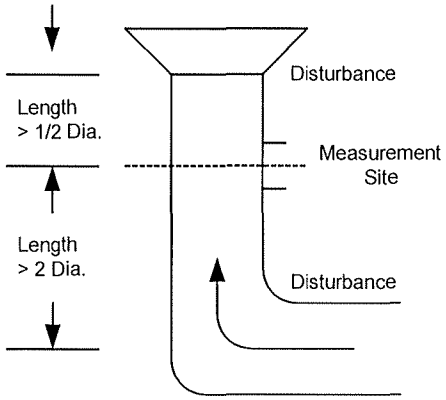




Job:	Specialty Minerals, Inc. Iron Mountain, Michigan
Date:	May 5, 2022
Test Location:	Three Carbonators Common Stack
Stack Diameter:	3.0 Feet
Stack Area:	7.069 Square Feet
No. Points Across Diameter:	8
No. of Ports:	2

GASEOUS TRAVERSE FOR ROUND DUCTS





Job: Specialty Minerals, Inc.
Iron Mountain, Michigan

Date: May 5, 2022

Test Location: Three Carbonators Common Stack

Stack Diameter: 3.0 Feet

Stack Area: 7.07 Square Feet

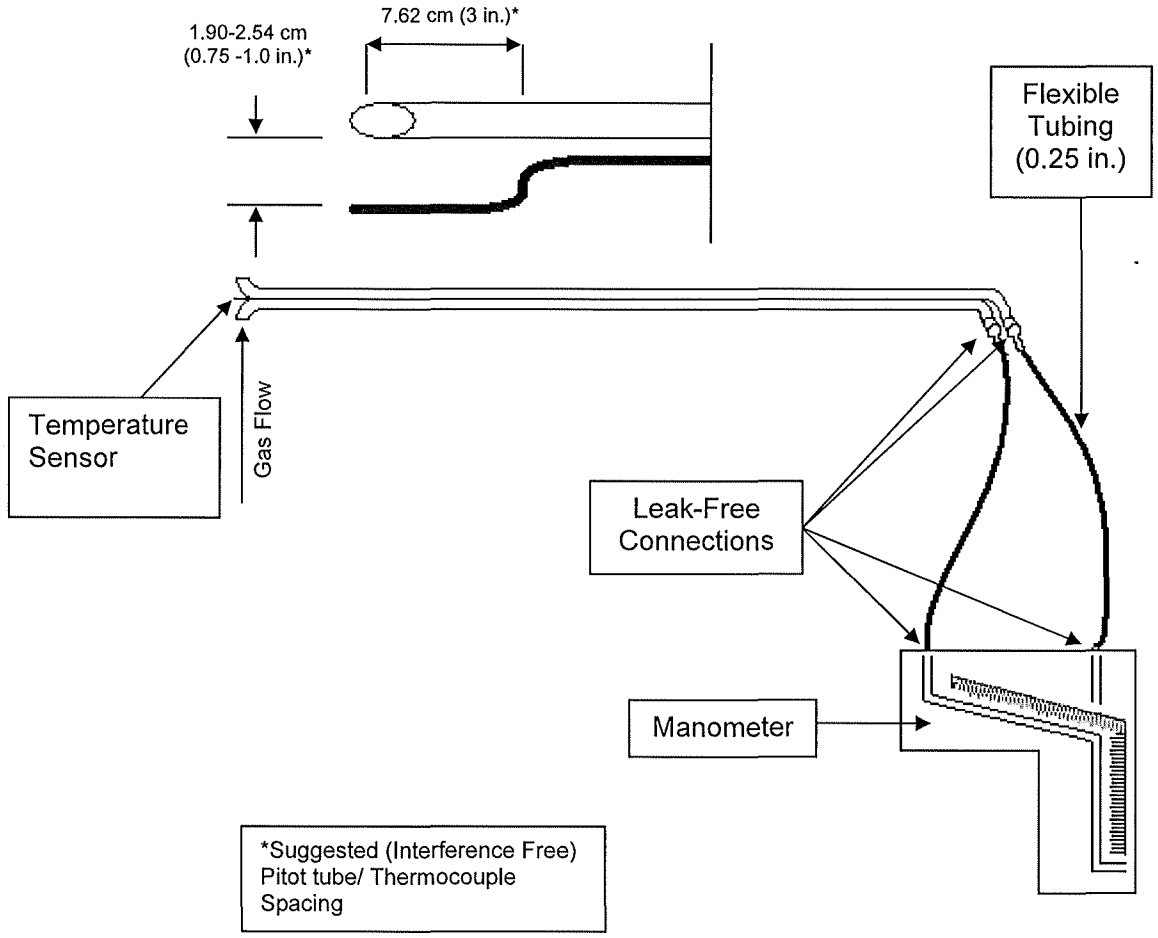
No. Sample Points: 3

Distance from Inside Wall
To Traverse Point:

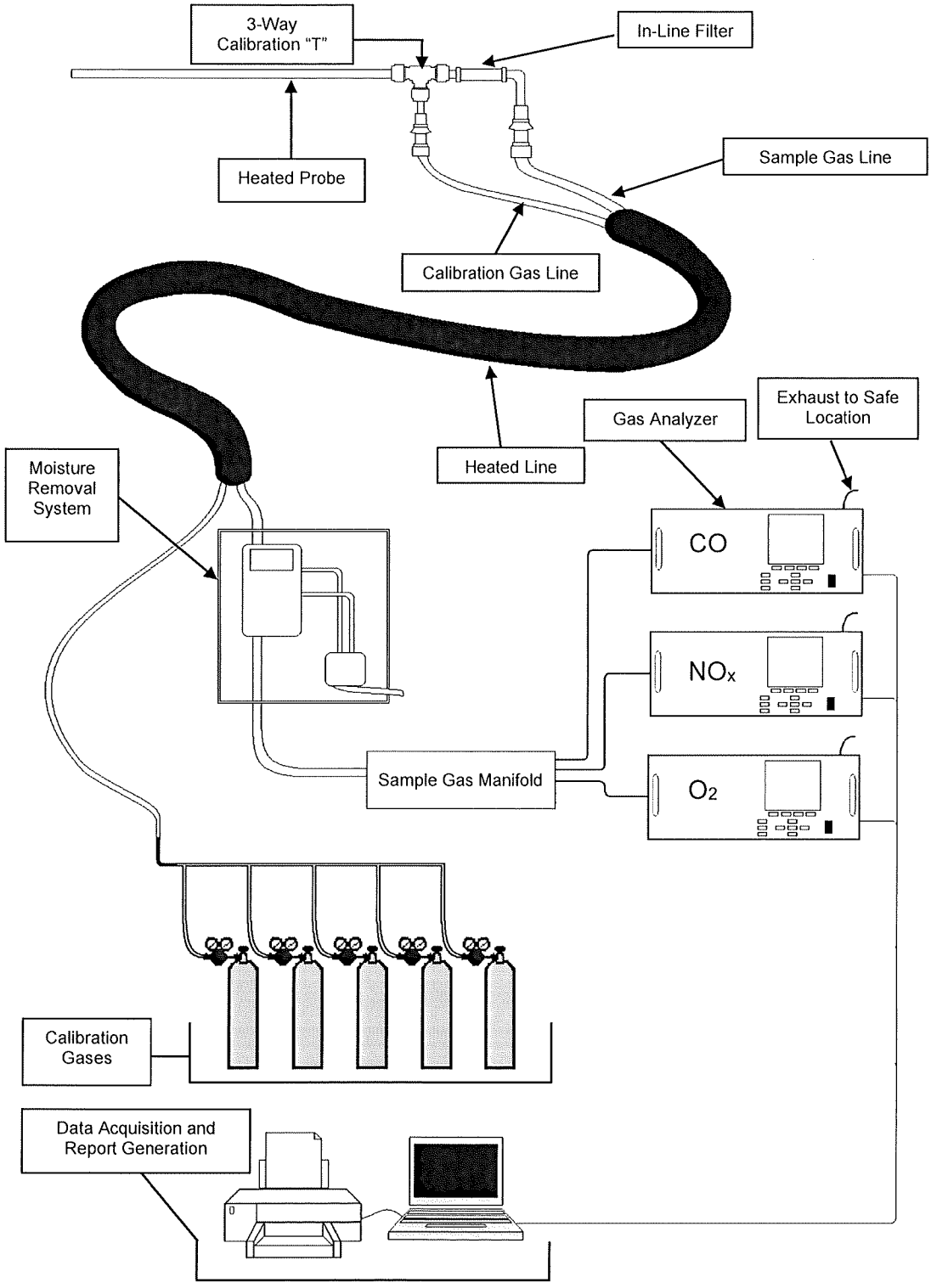
1. 83.3 % of diameter
2. 50.0 % of diameter
3. 16.7 % of diameter

Appendix C - Sample Train Diagrams

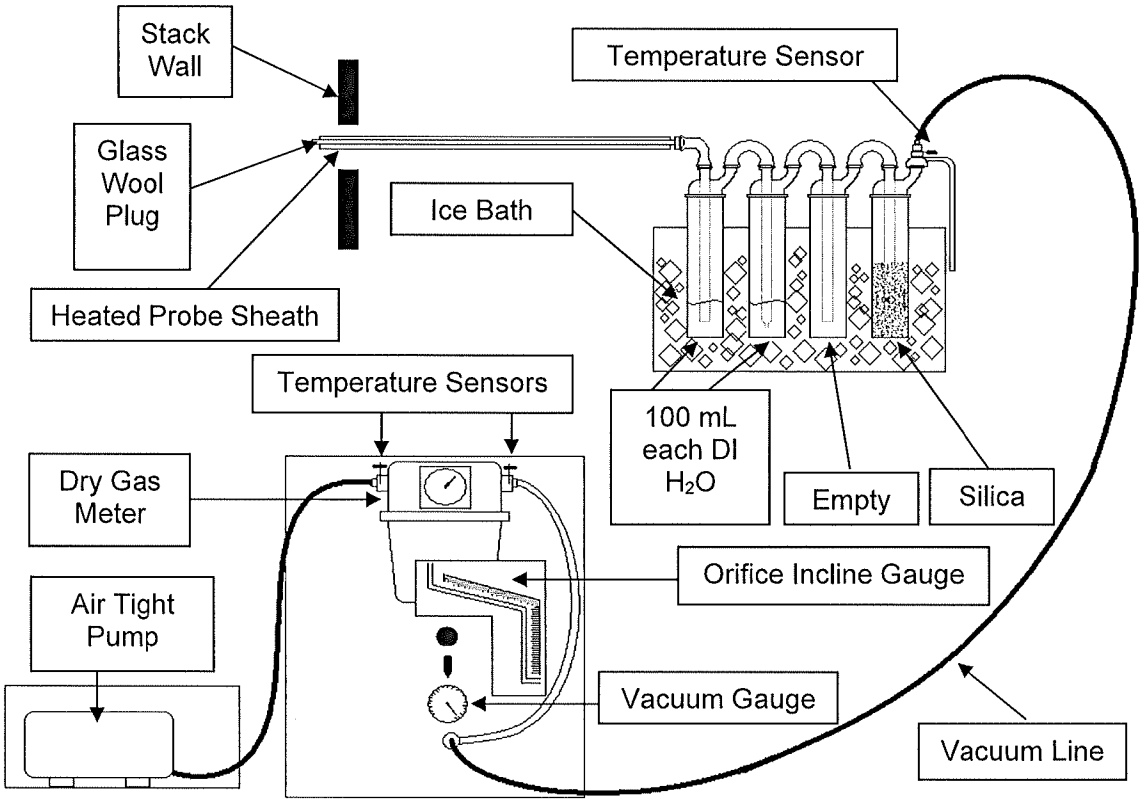
USEPA Method 2 – Type S Pitot Tube Manometer Assembly



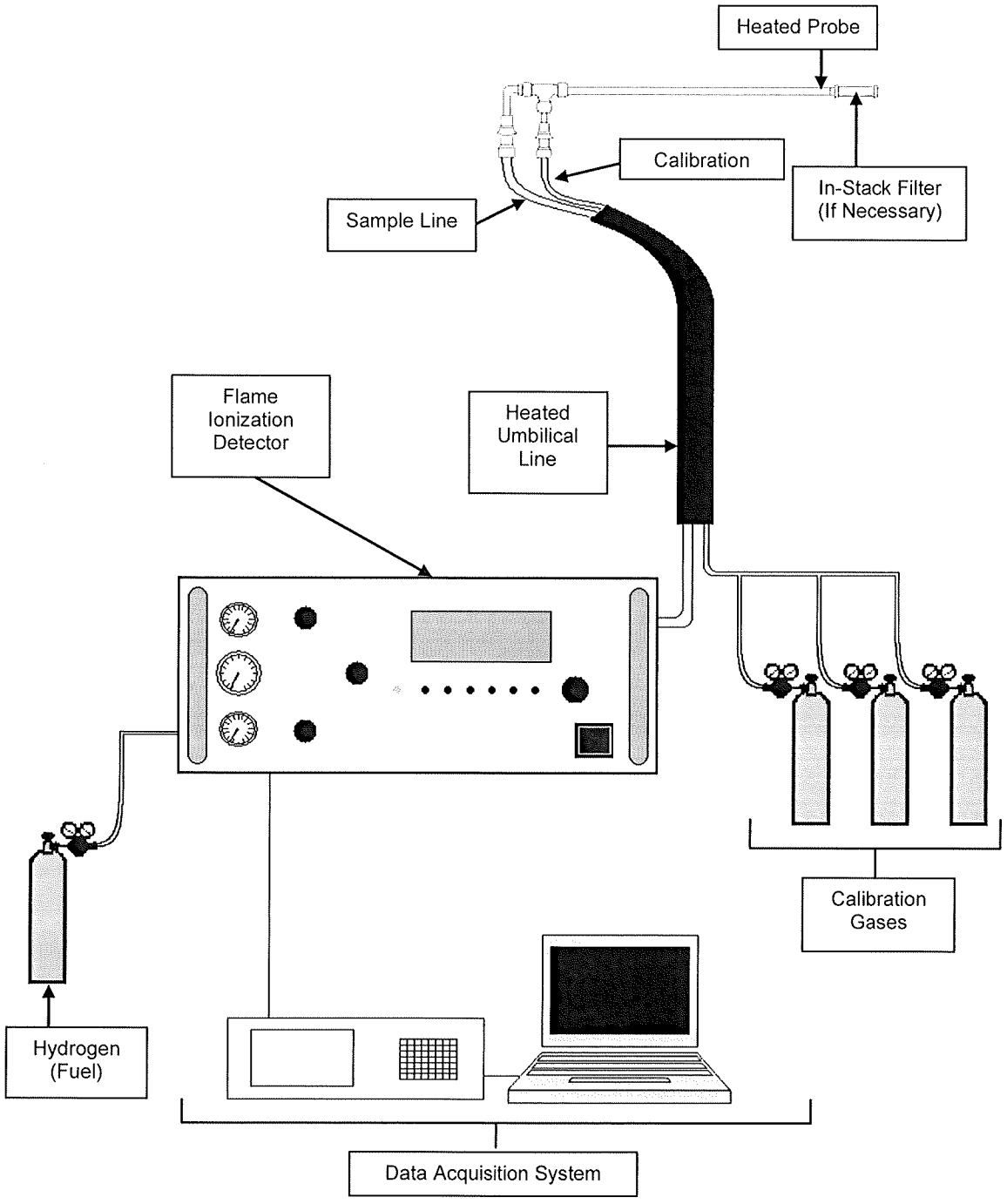
USEPA Methods 3A, 7E, and 10 Extractive Gaseous Sampling Diagram



USEPA Method 4- Moisture Content Sample Train Diagram



USEPA Method 25A – Total Gaseous Organic Compound Sample Train



Appendix D - Calculation Nomenclature and Formulas