mostardi platt

Compliance Emissions Test Report

St Marys Cement
Charlevoix Plant
Coal Mill Exhaust Stack
Charlevoix, Michigan

Report Submittal Date:
December 6, 2023

Project No. M233904B

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

Corporate Headquarters
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630-993-2100

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1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a compliance particulate matter (PM) test program for St Marys Cement at the Charlevoix Plant in Charlevoix, Michigan on the Coal Mill Stack on October 17, 2023. This report summarizes the results of the test program and test methods used.

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

TEST INFORMATION		
Test Location	**Test Date**	**Test Parameters**
Coal Mill Stack	October 17, 2023	PM/PM_{10}/$PM_{2.5}$

The purpose of this test program was to determine the PM concentrations from the Coal Mill Stack.

Test Location	Parameter	Test Method	Emission Rate	Emission Limit
Coal Mill Stack	FPM	USEPA Method 5, 40CFR60, Appendix A	0.0013 grains/dscf	0.010 grains/dscf
	PM_{10}	USEPA Method 5, 40CFR60, Appendix A, and Method 202, 40CFR51, Appendix M	0.304 lh/hr	3.93 lb/hr
	$PM_{2.5}$	USEPA Method 5, 40CFR60, Appendix A, and Method 202, 40CFR51, Appendix M	0.304 lh/hr	1.86 lb/hr

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

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	St Marys Cement Charlevoix Cement Plant 16000 Bells Bay Road Charlevoix, Michigan 49720	Ms. Laurie Leaman Environmental Manager (231) 237-1387 laurie.leaman@vcimentos.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Nicholas C. Colangelo Project Manager 630-993-2100 (phone) ncolangelo@mp-mail.com

The test crew consisted of C. Chambers, A. Wentworth, and N. Colangelo of Mostardi Platt.

2.0 TEST METHODOLOGY

Emission testing was conducted following the United States Environmental Protection Agency (USEPA) methods specified in 40CFR60, Appendix A in addition the Mostardi Platt Quality Manual.

Process data as provided by St Marys Cement are included in Appendix A.
Schematics of the test section diagram and sampling trains used are included in Appendix B and C respectively. Calculation nomenclature is included in Appendix D. Laboratory analysis for each test run are included in Appendix E. The computerized reference method test data is included in Appendix F.

The following methodologies were used during the test program:

Method 1 Sample and Velocity Traverse Determination

Test measurement points were selected in accordance with USEPA Method 1, 40CFR60, Appendix A. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION							
Test Location	**Stack Dimensions**	**No. of Ports**	**Port Length (Inches)**	**Upstream Diameters**	**Downstream Diameters**	**Test Parameter**	**Number of Sampling Points**
Coal Mill Exhaust Stack	4.25	2	8	>0.5	>2.0	PM/PM_{10}/$PM_{2.5}$	24

Method 2 Volumetric Flow Rate Determination

Gas velocity was measured following USEPA Method 2, 40CFR60, Appendix A, for purposes of calculating stack gas volumetric flow rate and emission rates on a lb/hr basis. S-type pitot tubes, 0-10" differential pressure gauge, and K-type 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. Copies of field data sheets are included in Appendix G. Calibration data are presented in Appendix H. This testing met the performance specifications as outlined in the Method.

Method 3A CO_2/O_2 Determination

CO_2 and O_2 were determined in accordance with Method 3A, 40CFR60. The CO_2 analyzer operates in the nominal range of 0% to 20%, while the O_2 analyzer operates in the nominal range of 0% to 25%. All calibrations were performed using Protocol One gas. Zero nitrogen (a low ppm pollutant in balance nitrogen calibration gases) was introduced during other instrument calibrations to check instrument zero. Zero and mid-range calibrations were performed after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks are appended to the final report. Copies of calibration gas certifications are also be appended to the final report. This testing meets the performance specifications as outlined in the Method.

Method 5 Filterable Particulate Matter Determination

Particulate matter was sampled in accordance with USEPA Method 5, 40 CFR Part 60, Appendix A. The FPM runs were sixty (60) minutes in duration, with a minimum of 60 dry standard cubic feet sampled. A glass-lined probe was used for sampling FPM.

The sampling train is manufactured by Environmental Supply Corporation and meets all specifications required by Method 5. Drawings depicting the sampling ports, test point locations, and sampling train are appended. Velocity pressures were determined concurrently during sampling utilizing a standard pitot tube and inclined manometer. All temperatures were measured using K-type thermocouples with calibrated digital temperature indicators. The gas stream was sampled at ambient temperature, the sampling probe and filter were operated no higher than 250°F, to prevent water condensation on the filter. Moisture determinations per USEPA Test Method 4, 40CFR60, Appendix A, are performed as a portion of the Method 5 FPM testing.

The filter media are Whatman quartz microfiber filters exhibiting a 99.97% efficiency on 0.3-micron DOP smoke particles in accordance with ASTM Standard Method D-2986-71. All sample contact surfaces of the train were washed with HPLC reagent-grade acetone. These washes were placed in sealed and marked containers for transport.

All sample recovery was performed at the test site by the test crew. All final particulate sample analyses were performed by Mostardi Platt personnel at the laboratory in Henderson, Nevada. Copies of all sample analysis sheets, explanations of nomenclature and calculations, and raw field data sheets are appended.

Method 202 Condensable Particulate Matter Determination

Flue gas condensable particulate concentrations and emission rates were determined in accordance with the Method 202, in conjunction with Method 5 filterable particulate matter sampling. Condensable particulate matter was collected in the impinger portion of the sampling train. The condensable particulate matter (CPM) was collected in impingers after filterable particulate matter material was collected utilizing Method 5. The organic and aqueous fractions were then taken to dryness and weighed. The total of all fractions represents the CPM. Compared to the December 17, 1991 promulgated Method 202, this Method includes the addition of a condenser, followed by a water dropout impinger immediately after the final heated filter. One modified Greenburg Smith impinger and an ambient temperature filter follow the water dropout impinger. A schematic of the sampling train configured with these updates is found in Appendix C.

CPM was collected in the water dropout, modified Greenburg Smith impinger and ambient filter portion of the sampling train as described in this method. The impinger contents were purged with nitrogen (N2) immediately after sample collection to remove dissolved sulfur dioxide (SO2) gases from the impingers. The impinger solution was then extracted with Deionized (DI) water, acetone, and hexane. The organic and aqueous fractions were dried and the residues weighed. The total of the aqueous, organic, and ambient filter fractions represents the CPM.

3.0 TEST RESULT SUMMARIES

Client: St Marys Cement
Facility: Charlevoix Plant
Test Location: Coal Mill Stack
Test Method: 5/202

Source Condition	Normal	Normal	Normal	
Date	10/17/23	10/17/23	10/17/23	
Start Time	8:37	10:38	12:35	
End Time	9:42	11:40	13:38	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	126.5	129.4	139.5	131.8
Flue Gas Moisture, percent by volume	1.4%	1.6%	1.6%	1.5%
Average Flue Pressure, in. Hg	29.28	29.28	29.28	29.28
Gas Sample Volume, dscf	61.486	65.973	70.168	65.876
Average Gas Velocity, ft/sec	27.557	29.670	32.082	29.770
Gas Volumetric Flow Rate, acfm	23,456	25,254	27,307	25,339
Gas Volumetric Flow Rate, dscfm	20,376	21,781	23,161	21,773
Gas Volumetric Flow Rate, scfm	20,661	22,138	23,534	22,111
Average %CO_2 by volume, dry basis	0.0	0.0	0.0	0.0
Average %O_2 by volume, dry basis	20.8	20.9	20.7	20.8
Isokinetic Variance	96.7	97.0	97.0	96.9
Filterable Particulate Matter (Method 5)				
grams collected	0.00843	0.00417	0.00312	0.00524
grains/acf	0.0018	0.0008	0.0006	0.0011
grains/dscf	0.0021	0.0010	0.0007	0.0013
lb/hr	0.369	0.182	0.136	0.229
Condensable Particulate Matter (Method 202)				
grams collected	0.00221	0.00172	0.00120	0.00171
grains/acf	0.0005	0.0003	0.0002	0.0003
grains/dscf	0.0006	0.0004	0.0003	0.0004
lb/hr	0.097	0.075	0.052	0.075
Total Particulate Matter (5/202)				
grams collected	0.01064	0.00589	0.00432	0.00695
grains/acf	0.0023	0.0011	0.0008	0.0014
grains/dscf	0.0027	0.0014	0.0010	0.0017
lb/hr	0.466	0.257	0.188	0.304

4.0 CERTIFICATION

Mostardi Platt is pleased to have been of service to St Marys Cement. 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

Nicholas C. Colangelo — Project Manager

Jeffrey M. Crivlare — Quality Assurance

APPENDICES

Appendix A- Plant Operating Data

		EDT	EDT	Avg BLDS
10/17/2023	Run 1	8:37	9:42	0.63
10/17/2023	Run 2	10:38	11:40	1.04
10/17/2023	Run 3	12:30	13:38	0.48

	BLDS	Coke Feed tph	Coal Feed tph
10/17/2023 8:37	0.56	14.90	6.53
10/17/2023 8:38	0.56	14.90	6.53
10/17/2023 8:39	0.55	14.90	6.52
10/17/2023 8:40	0.55	14.90	6.52
10/17/2023 8:41	0.55	14.90	6.52
10/17/2023 8:42	0.55	14.90	6.52
10/17/2023 8:43	0.55	14.90	6.52
10/17/2023 8:44	0.55	14.89	6.52
10/17/2023 8:45	0.55	14.89	6.52
10/17/2023 8:46	0.54	14.89	6.52
10/17/2023 8:47	0.54	14.89	6.52
10/17/2023 8:48	0.55	14.89	6.52
10/17/2023 8:49	0.55	14.89	6.52
10/17/2023 8:50	0.55	14.89	6.51
10/17/2023 8:51	0.56	14.89	6.51
10/17/2023 8:52	0.56	14.89	6.51
10/17/2023 8:53	0.56	14.89	6.51
10/17/2023 8:54	0.57	14.89	6.51
10/17/2023 8:55	0.57	14.89	6.51
10/17/2023 8:56	0.58	14.89	6.51
10/17/2023 8:57	0.58	14.89	6.51
10/17/2023 8:58	0.58	14.89	6.51
10/17/2023 8:59	0.59	14.89	6.51
10/17/2023 9:00	0.59	14.89	6.51
10/17/2023 9:01	0.59	14.89	6.50
10/17/2023 9:02	0.60	14.89	6.50
10/17/2023 9:03	0.60	14.89	6.50
10/17/2023 9:04	0.60	14.89	6.50
10/17/2023 9:05	0.61	14.89	6.50
10/17/2023 9:06	0.61	14.89	6.50
10/17/2023 9:07	0.61	14.89	6.50
10/17/2023 9:08	0.62	14.89	6.50
10/17/2023 9:09	0.62	14.89	6.50
10/17/2023 9:10	0.62	14.89	6.50
10/17/2023 9:11	0.63	14.89	6.49
10/17/2023 9:12	0.63	14.89	6.49
10/17/2023 9:13	0.63	14.89	6.49
10/17/2023 9:14	0.64	14.89	6.49
10/17/2023 9:15	0.64	14.89	6.49
10/17/2023 9:16	0.65	14.89	6.49
10/17/2023 9:17	0.65	14.89	6.49
10/17/2023 9:18	0.65	14.89	6.49
10/17/2023 9:19	0.66	14.89	6.49
10/17/2023 9:20	0.66	14.89	6.49
10/17/2023 9:21	0.66	14.88	6.49
10/17/2023 9:22	0.67	14.88	6.48
10/17/2023 9:23	0.67	14.88	6.48
10/17/2023 9:24	0.67	14.88	6.48
10/17/2023 9:25	0.68	14.88	6.48
10/17/2023 9:26	0.68	14.88	6.48
10/17/2023 9:27	0.68	14.88	6.48
10/17/2023 9:28	0.69	14.88	6.48
10/17/2023 9:29	0.69	14.88	6.48
10/17/2023 9:30	0.69	14.88	6.48
10/17/2023 9:31	0.70	14.88	6.48
10/17/2023 9:32	0.70	14.88	6.48
10/17/2023 9:33	0.71	14.88	6.47
10/17/2023 9:34	0.71	14.88	6.47
10/17/2023 9:35	0.71	14.88	6.47
10/17/2023 9:36	0.72	14.88	6.47
10/17/2023 9:37	0.72	14.88	6.47
10/17/2023 9:38	0.72	14.88	6.47
10/17/2023 9:39	0.73	14.88	6.47
10/17/2023 9:40	0.73	14.88	6.47
10/17/2023 9:41	0.73	14.88	6.47
10/17/2023 9:42	0.74	14.88	6.47

Average	0.63

	BLDS	Coke Feed tph	Coal Feed tph
10/17/2023 10:38	0.93	14.86	6.41
10/17/2023 10:39	0.94	14.86	6.40
10/17/2023 10:40	0.94	14.86	6.40
10/17/2023 10:41	0.94	14.86	6.40
10/17/2023 10:42	0.95	14.86	6.40
10/17/2023 10:43	0.95	14.86	6.40
10/17/2023 10:44	0.95	14.86	6.39
10/17/2023 10:45	0.96	14.86	6.39
10/17/2023 10:46	0.96	14.86	6.39
10/17/2023 10:47	0.96	14.86	6.39
10/17/2023 10:48	0.97	14.86	6.39
10/17/2023 10:49	0.97	14.86	6.38
10/17/2023 10:50	0.98	14.86	6.38
10/17/2023 10:51	0.98	14.86	6.38
10/17/2023 10:52	0.98	14.86	6.38
10/17/2023 10:53	0.99	14.78	6.38
10/17/2023 10:54	0.99	14.62	6.37
10/17/2023 10:55	0.99	14.47	6.37
10/17/2023 10:56	1.00	14.31	6.37
10/17/2023 10:57	1.00	14.16	6.37
10/17/2023 10:58	1.00	14.00	6.37
10/17/2023 10:59	1.01	13.85	6.37
10/17/2023 11:00	1.01	13.70	6.36
10/17/2023 11:01	1.01	13.54	6.36
10/17/2023 11:02	1.02	13.39	6.36
10/17/2023 11:03	1.02	13.23	6.36
10/17/2023 11:04	1.02	13.08	6.36
10/17/2023 11:05	1.03	12.92	6.35
10/17/2023 11:06	1.03	12.77	6.35
10/17/2023 11:07	1.03	12.61	6.35
10/17/2023 11:08	1.04	12.61	6.35
10/17/2023 11:09	1.04	12.61	6.35
10/17/2023 11:10	1.05	12.61	6.34
10/17/2023 11:11	1.05	12.61	6.34
10/17/2023 11:12	1.05	12.61	6.34
10/17/2023 11:13	1.06	12.61	6.34
10/17/2023 11:14	1.06	12.61	6.34
10/17/2023 11:15	1.06	12.61	6.34
10/17/2023 11:16	1.07	12.61	6.33
10/17/2023 11:17	1.07	12.61	6.33
10/17/2023 11:18	1.07	12.61	6.33
10/17/2023 11:19	1.08	12.61	6.33
10/17/2023 11:20	1.08	12.61	6.33
10/17/2023 11:21	1.08	12.61	6.32
10/17/2023 11:22	1.09	12.61	6.32
10/17/2023 11:23	1.09	12.61	6.32
10/17/2023 11:24	1.09	12.61	6.32
10/17/2023 11:25	1.10	12.61	6.32
10/17/2023 11:26	1.10	12.61	6.31
10/17/2023 11:27	1.11	12.61	6.31
10/17/2023 11:28	1.11	12.61	6.31
10/17/2023 11:29	1.11	12.61	6.31
10/17/2023 11:30	1.12	12.61	6.31
10/17/2023 11:31	1.12	12.61	6.30
10/17/2023 11:32	1.12	12.61	6.30
10/17/2023 11:33	1.13	12.61	6.30
10/17/2023 11:34	1.13	12.61	6.30
10/17/2023 11:35	1.13	12.61	6.30
10/17/2023 11:36	1.14	12.61	6.30
10/17/2023 11:37	1.14	12.62	6.29
10/17/2023 11:38	1.14	12.62	6.29
10/17/2023 11:39	1.15	12.62	6.29
10/17/2023 11:40	1.15	12.62	6.29

Average	1.04

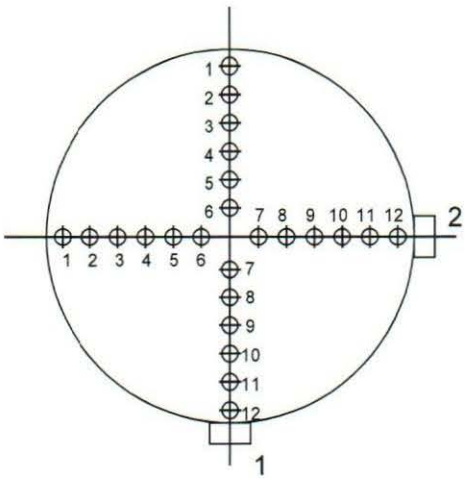
	BLDS	Coke Feed tph	Coal Feed tph
10/17/2023 12:30	0.71	11.75	6.19
10/17/2023 12:31	0.71	11.70	6.19
10/17/2023 12:32	0.68	11.76	6.19
10/17/2023 12:33	0.65	12.04	6.19
10/17/2023 12:34	0.62	12.33	6.19
10/17/2023 12:35	0.59	12.60	6.18
10/17/2023 12:36	0.56	12.61	6.18
10/17/2023 12:37	0.53	12.61	6.18
10/17/2023 12:38	0.50	12.61	6.18
10/17/2023 12:39	0.47	12.61	6.18
10/17/2023 12:40	0.47	12.61	6.17
10/17/2023 12:41	0.47	12.62	6.17
10/17/2023 12:42	0.47	12.62	6.17
10/17/2023 12:43	0.47	12.62	6.17
10/17/2023 12:44	0.47	12.62	6.17
10/17/2023 12:45	0.47	12.62	6.17
10/17/2023 12:46	0.47	12.63	6.16
10/17/2023 12:47	0.47	12.63	6.16
10/17/2023 12:48	0.47	12.63	6.16
10/17/2023 12:49	0.47	12.63	6.16
10/17/2023 12:50	0.47	12.63	6.16
10/17/2023 12:51	0.47	12.64	6.15
10/17/2023 12:52	0.47	12.64	6.15
10/17/2023 12:53	0.47	12.64	6.15
10/17/2023 12:54	0.47	12.64	6.15
10/17/2023 12:55	0.47	12.64	6.15
10/17/2023 12:56	0.47	12.65	6.14
10/17/2023 12:57	0.47	12.65	6.14
10/17/2023 12:58	0.47	12.65	6.14
10/17/2023 12:59	0.47	12.65	6.14
10/17/2023 13:00	0.47	12.65	6.14
10/17/2023 13:01	0.47	12.65	6.14
10/17/2023 13:02	0.47	12.66	6.13
10/17/2023 13:03	0.46	12.66	6.13
10/17/2023 13:04	0.46	12.66	6.13
10/17/2023 13:05	0.46	12.66	6.13
10/17/2023 13:06	0.46	12.66	6.13
10/17/2023 13:07	0.46	12.67	6.12
10/17/2023 13:08	0.46	12.67	6.12
10/17/2023 13:09	0.46	12.67	6.12
10/17/2023 13:10	0.46	12.67	6.12
10/17/2023 13:11	0.46	12.67	6.12
10/17/2023 13:12	0.46	12.68	6.11
10/17/2023 13:13	0.46	12.68	6.11
10/17/2023 13:14	0.46	12.68	6.11
10/17/2023 13:15	0.46	12.68	6.11
10/17/2023 13:16	0.46	12.68	6.11
10/17/2023 13:17	0.46	12.69	6.10
10/17/2023 13:18	0.46	12.69	6.10
10/17/2023 13:19	0.46	12.69	6.10
10/17/2023 13:20	0.46	12.69	6.10
10/17/2023 13:21	0.46	12.69	6.10
10/17/2023 13:22	0.46	12.70	6.10
10/17/2023 13:23	0.46	12.70	6.09
10/17/2023 13:24	0.46	12.70	6.09
10/17/2023 13:25	0.46	12.70	6.09
10/17/2023 13:26	0.46	12.70	6.09
10/17/2023 13:27	0.46	12.71	6.09
10/17/2023 13:28	0.46	12.71	6.08
10/17/2023 13:29	0.46	12.71	6.08
10/17/2023 13:30	0.46	12.71	6.08
10/17/2023 13:31	0.46	12.71	6.08
10/17/2023 13:32	0.46	12.72	6.08
10/17/2023 13:33	0.46	12.72	6.07
10/17/2023 13:34	0.46	12.72	6.07
10/17/2023 13:35	0.46	12.72	6.07
10/17/2023 13:36	0.46	12.72	6.07
10/17/2023 13:37	0.46	12.73	6.07
10/17/2023 13:38	0.46	12.73	6.07

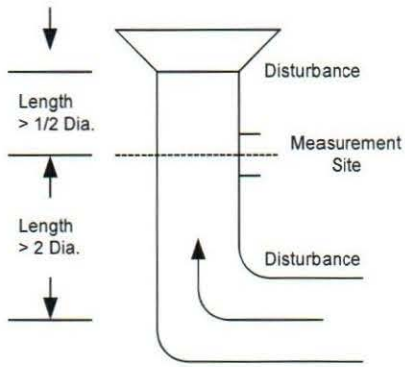
Average	0.48

Appendix B- Test Section Diagram

EQUAL AREA TRAVERSE FOR ROUND DUCTS

(Particulate Matter)

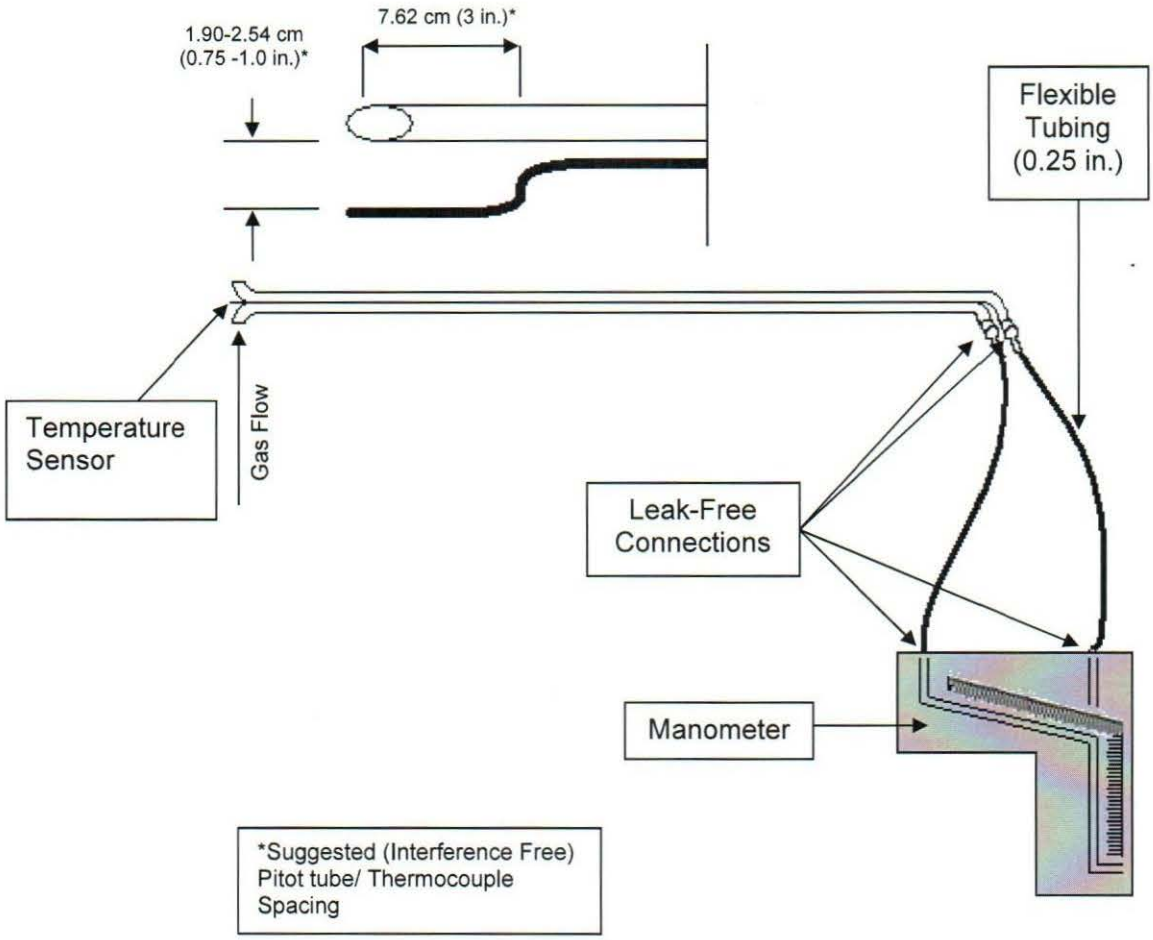




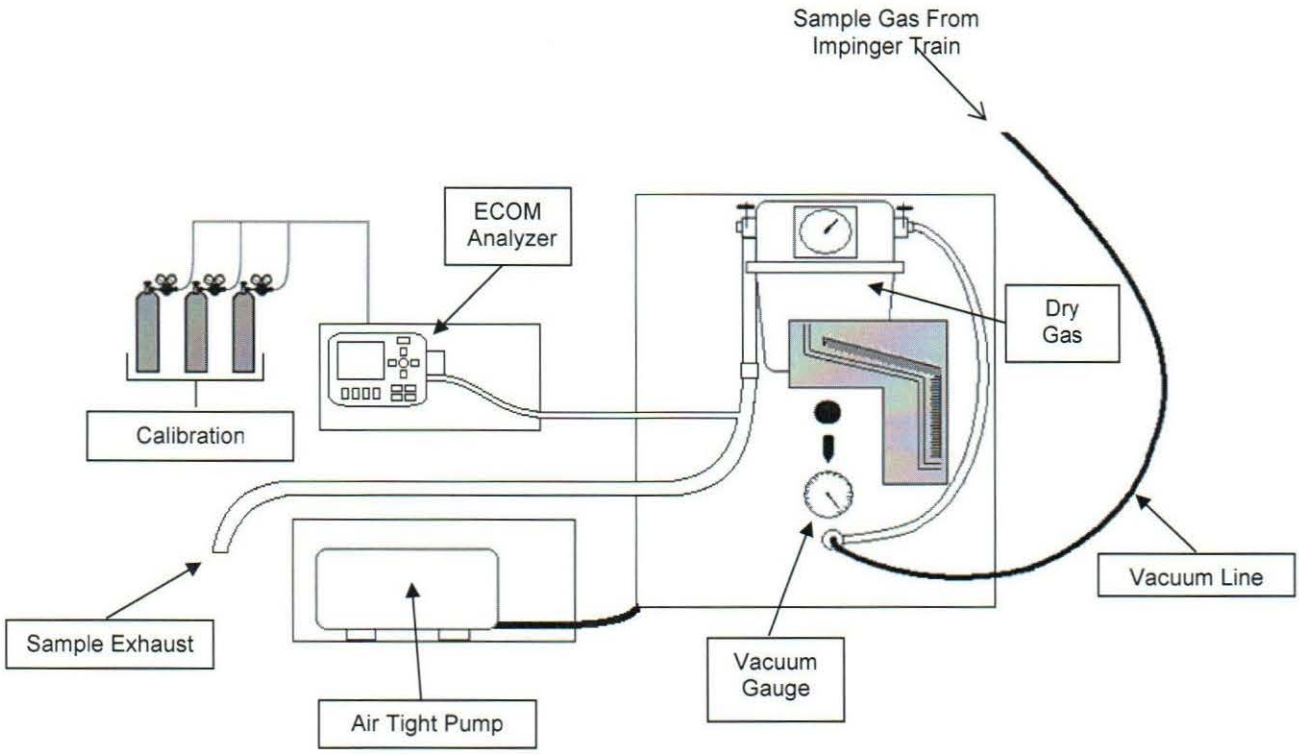
Project:	St Marys Cement Charlevoix Plant Charlevoix, Michigan
Test Location:	Coal Mill Stack
Test Date:	October 17, 2023
No. Sample Points:	24
Diameter:	4.25 Feet
Flue Area:	14.19 Square Feet
Upstream Diameters:	>0.5
Downstream Diameters:	>2.0

Appendix C- Sample Train Diagrams

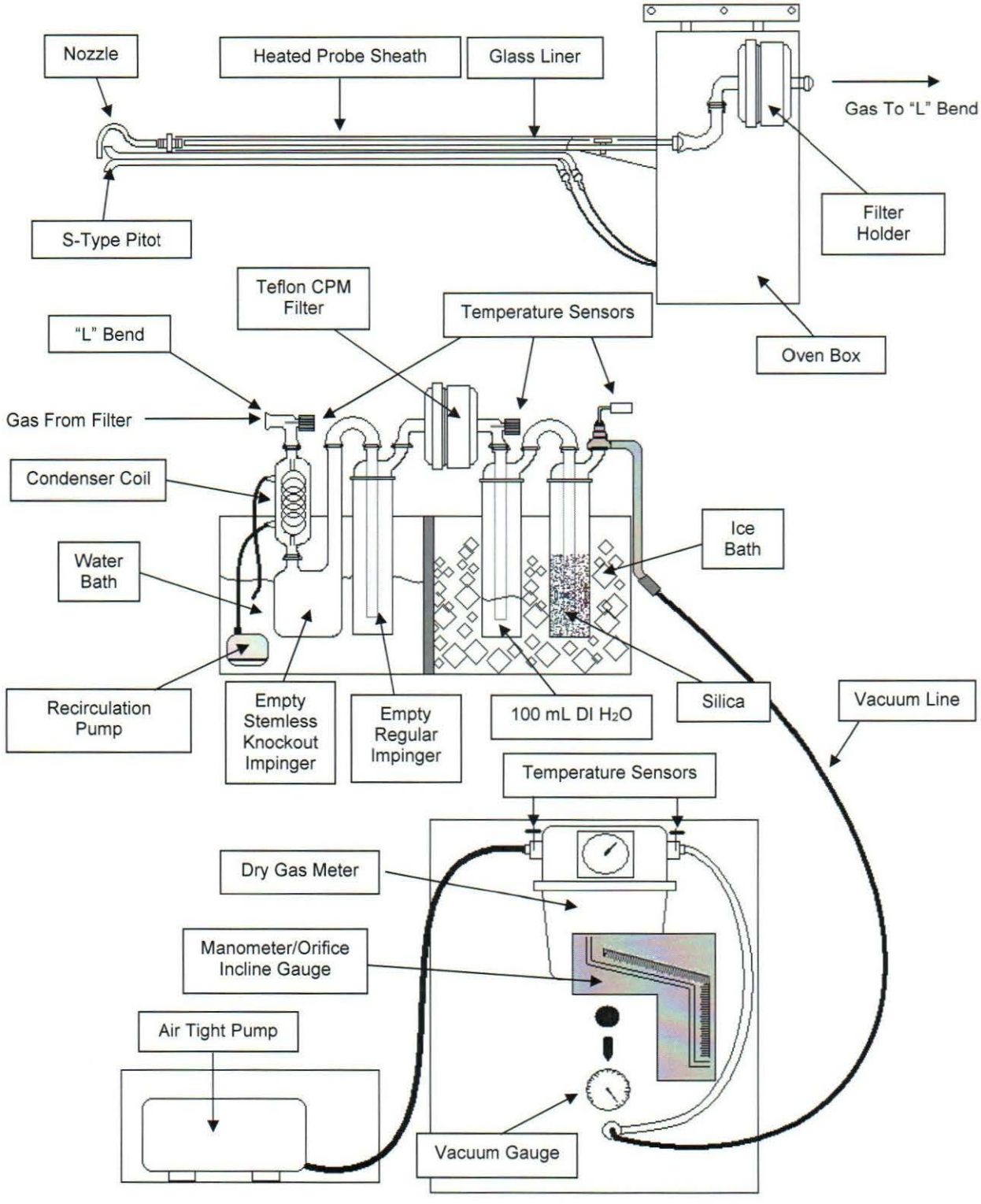
USEPA Method 2 – Type S Pitot Tube Manometer Assembly



USEPA Method 3A - Integrated Oxygen/Carbon Dioxide Sample Train Diagram Utilizing ECOM To Measure from Sample Exhaust



USEPA Method 5/202- Filterable/Condensable Particulate Matter



Appendix D- Calculation Nomenclature and Formulas