1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a compliance test program for Holcim (US) Inc. d/b/a Lafarge Alpena at the Alpena Cement Plant in Alpena, Michigan. This report summarizes the results of the test program and test methods.

The test locations, test dates, and test parameter are summarized below.

TEST INFORMATION		
Test Locations	**Test Dates**	**Test Parameter**
Kiln 19 Breaching Duct	January 12, 2022	Filterable Particulate Matter (FPM)

The purpose of the test program was to demonstrate compliance with Title 40, *Code of Federal Regulations*, Part 60 (40CFR60), and 40CFR63, Subpart LLL "*National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants.*" Specifically, to demonstrate that the below listed source meets its FPM emission limit and to establish a site-specific operating limit (SSOL) for the emission point's continuous parameter monitoring system (CPMS).

Test Location	Parameter	Emission Rate	Emission Limit	CPMS SSOL
Kiln 19 Breaching Duct	FPM	0.012 lb/ton	0.07 lb/ton	9.52

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

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	Holcim (US) Inc. Alpena Plant 1435 Ford Avenue Alpena, MI 49707	Ms. Mallory Miller Area Environmental Manager 224-517-6896 Mallory.Miller@lafargeholcim.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Chris Trezak Project Manager 630-336-7937 (phone) ctrezak@mp-mail.com

The test crew consisted of Messrs. D. Panek, J. Kukla, and C. Trezak.

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. Schematics of the test section diagram and sampling trains used are included in Appendix A and B respectively. Calculation nomenclature are included in Appendix C. Laboratory analysis for each test run are included in Appendix D. The computerized reference method test data is included in Appendix E. CEM data and process data as provided by Holcim (US) Inc. are also included in Appendix F.

The following methodologies were used during the test program:

2.1 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**
Kiln 19 Breaching Duct	8' x 9.91667'	3	3.25	77 inches	84 inches	FPM	27

2.2 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.

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

Flue gas O_2 and CO_2 concentrations for the Kiln 19 Breaching Duct were determined in accordance with USEPA Method 3A. An ECOM analyzer was used to determine the O_2 and CO_2 concentrations by connecting the analyzer to the exit of the dry gas meter. The O_2 instrument operates in the nominal range of 0% to 25% with the specific range determined by the high-level calibration gas. The CO_2 instrument operates in the nominal range of 0% to 20% with the specific range determined by the high-level calibration gas. High and mid-range calibrations were performed using USEPA Protocol 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 using USEPA Protocol gas after each test run. Copies of the gas cylinder certifications are found in Appendix H. Per section 8.6 of USEPA Method 2.

2.4 Method 5 Filterable Particulate Matter (FPM) Determination

Particulate matter was sampled in accordance with USEPA Method 5, 40CFR60, Appendix A. The particulate matter sampling train was manufactured by Environmental Supply Corporation and meets all specifications required by Method 5. Velocity pressures were determined simultaneously during sampling with an S-type pitot tube and inclined manometer. All temperatures were measured using K-type thermocouples with calibrated digital temperature indicators. The probe and filter temperatures were maintained at 248°F +/- 25°F throughout sampling.

The filter media is high purity quartz that meet all requirements of Method 5. All sample contact surfaces of the train were washed with HPLC reagent-grade acetone. These washes were placed in sealed and marked containers for analysis.

All sample recoveries were performed at the test site by the test crew. All final particulate sample analyses were performed by Mostardi Platt personnel at the laboratory in Elmhurst, Illinois.

Laboratory analysis data are found in Appendix D. Calibration data are presented in Appendix H.

3.0 TEST RESULT SUMMARIES

Client: Holcim (US) Inc.
Facility: Alpena Cement Plant
Test Location: Kiln 19 Breaching Duct
Test Method: 5

Source Condition	Normal	Normal	Normal	
Date	1/12/22	1/12/22	1/12/22	
Start Time	8:40	10:15	12:00	
End Time	9:52	11:27	13:11	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	399.9	398.1	396.6	398.2
Flue Gas Moisture, percent by volume	6.0%	4.8%	6.0%	5.6%
Average Flue Pressure, in. Hg	29.06	29.06	29.06	29.06
Gas Sample Volume, dscf	39.847	40.328	40.734	40.303
Average Gas Velocity, ft/sec	31.796	31.956	32.268	32.007
Gas Volumetric Flow Rate, acfm	151,350	152,112	153,594	152,352
Gas Volumetric Flow Rate, dscfm	84,809	86,517	86,399	85,908
Gas Volumetric Flow Rate, scfm	90,262	90,913	91,953	91,043
Average $\%CO_2$ by volume, dry basis	16.1	15.6	16.7	16.1
Average $\%O_2$ by volume, dry basis	9.0	9.8	9.0	9.3
Isokinetic Variance	98.9	98.2	99.3	98.8
Clinker Production Rate, ton/hr	49.0	49.1	49.1	49.1
CPMS Response, mA	5.25	5.26	5.37	5.29
Filterable Particulate Matter (Method 5)				
grams collected	0.00215	0.00197	0.00231	0.00214
grains/acf	0.0005	0.0004	0.0005	0.0005
grains/dscf	0.0008	0.0008	0.0009	0.0008
lb/hr	0.605	0.559	0.648	0.604
lb/ton of clinker	0.012	0.011	0.013	0.012
Site Specific Operating Limit (SSOL) Determination				
Source Emissions Limit, lb/ton		0.07		
CPMS Zero, mA		4.00		
Filterable Particulate Matter, % of Emissions Limit		17.6%		
SSOL		9.52		

4.0 CERTIFICATION

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

As the program 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. The test program was performed in accordance with the test methods and the Mostardi Platt Quality Manual, as applicable.

MOSTARDI PLATT

Project Manager

Chris S. Trezak

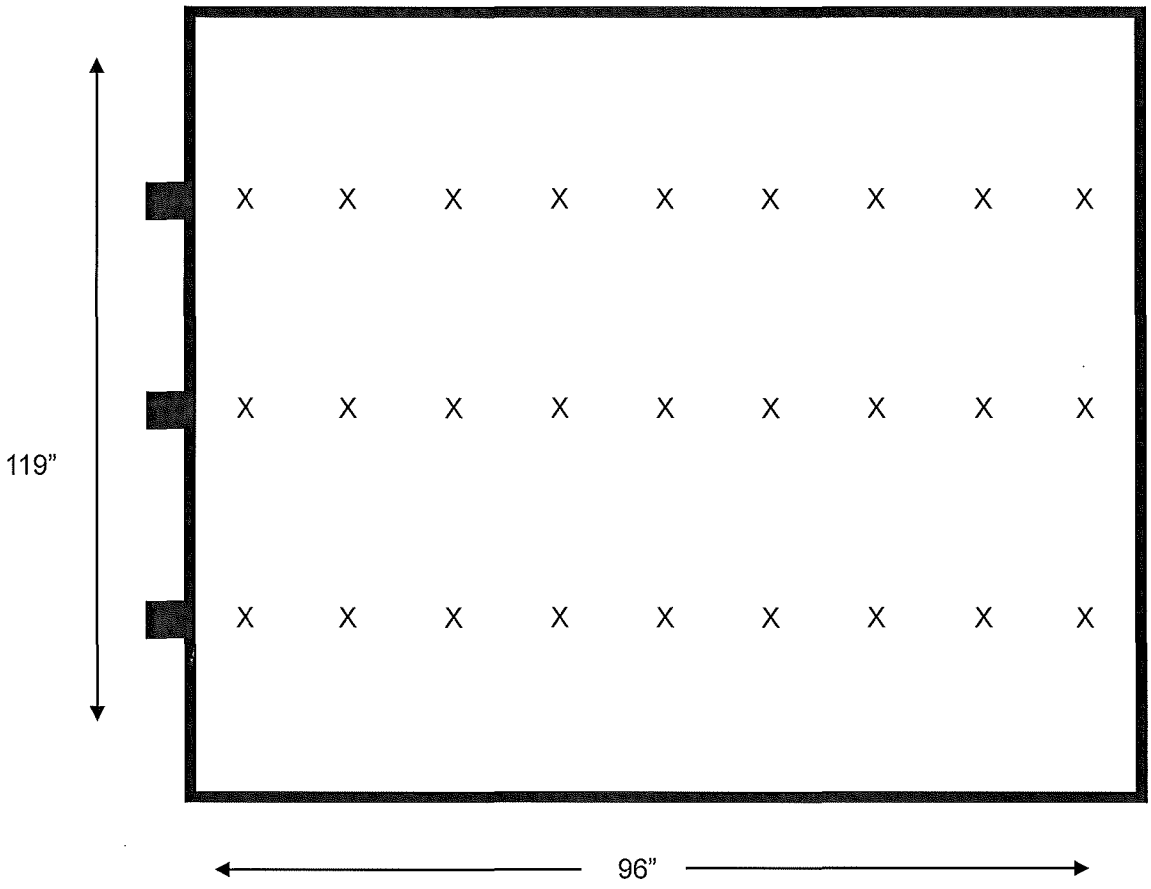
Quality Assurance

Jeffrey M. Crivlare

APPENDICES

Appendix A - Test Section Diagram

EQUAL AREA TRAVERSE
FOR RECTANGULAR DUCTS



Job: Holcim (US) Inc.
Alpena Cement Plant
Alpena, Michigan

Test Date: January 12, 2022

Test Location: Kiln 19 Breaching Duct

Length: 96 Inches

Width: 119 Inches

Upstream: 77.0 Inches

Downstream: 84.0 Inches

Equivalent Diameter: 106.3 Inches

Port Length: 3.25 Inches

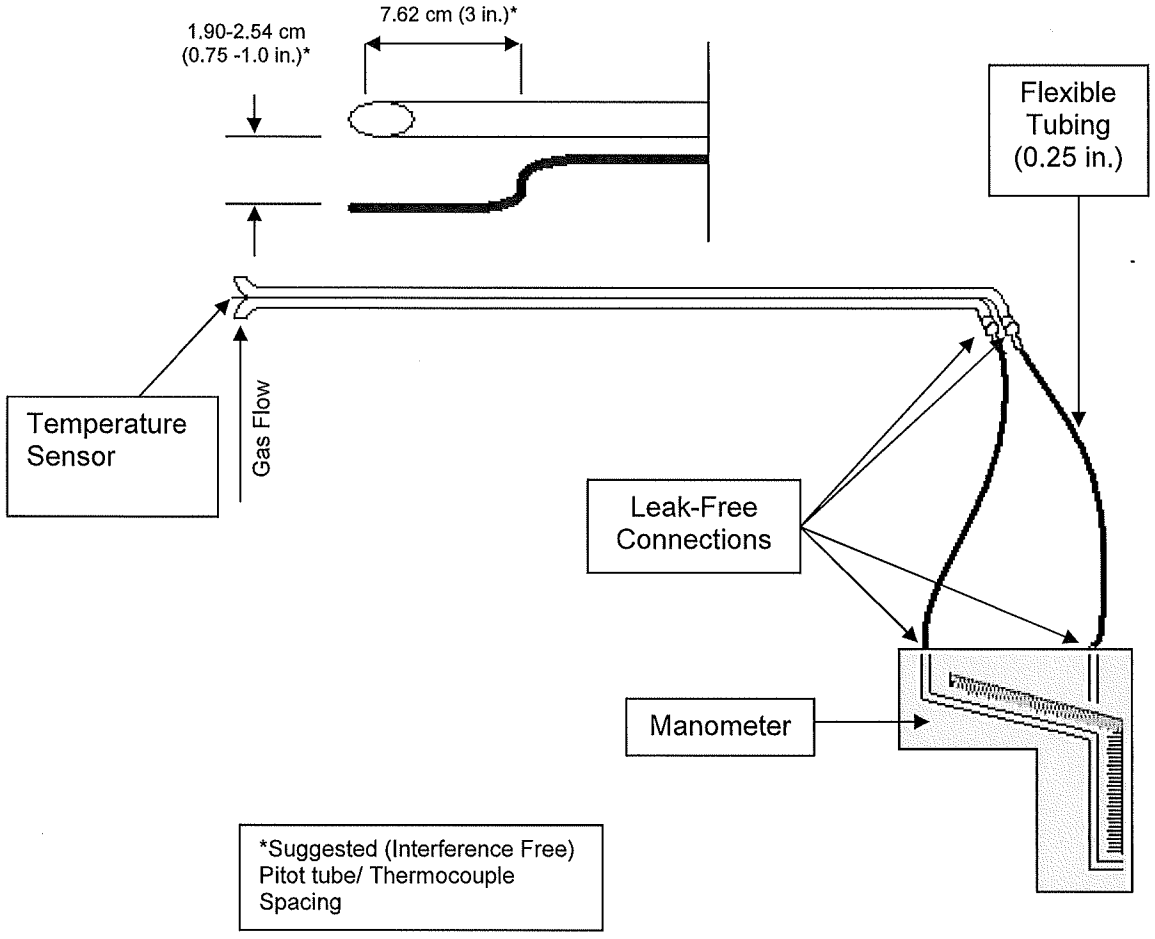
Area: 79.33 square feet

No. Test Ports: 3

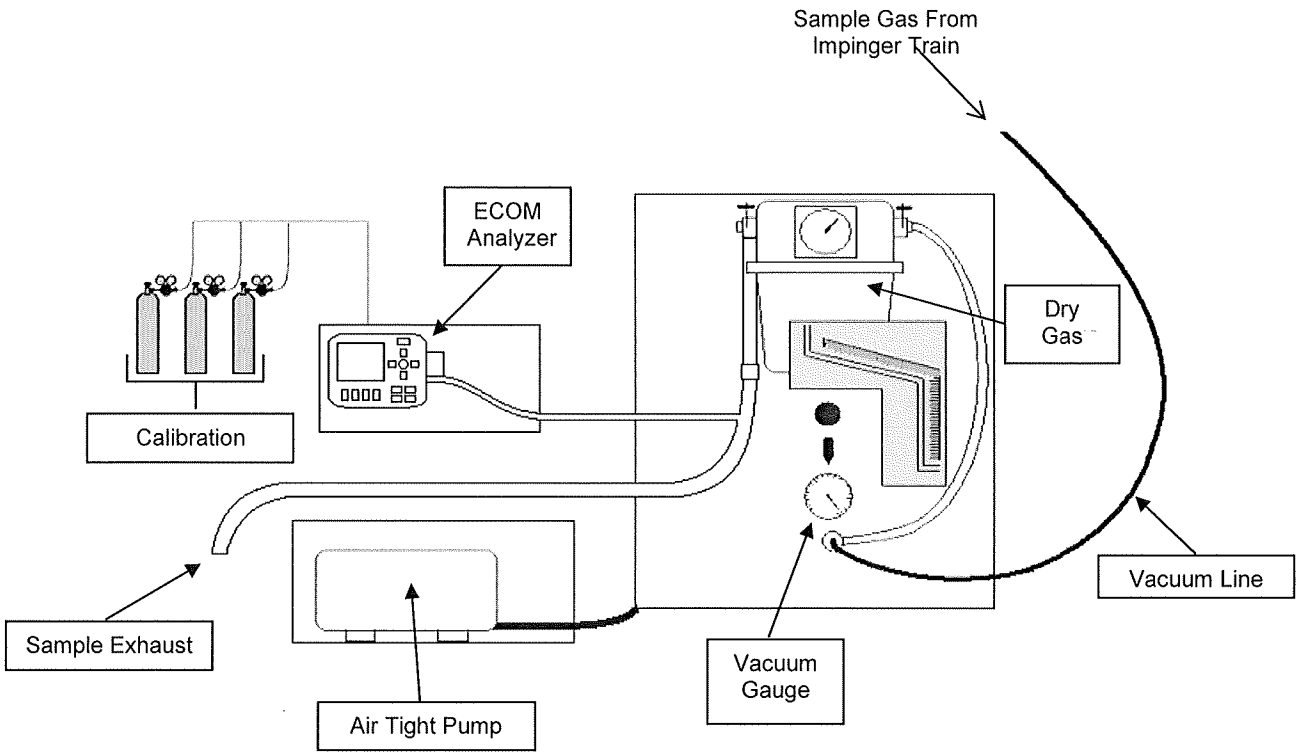
Tests Points per Port: 9

Appendix B - 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- Particulate Matter Sample Train Diagram