

1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a compliance test program for Holcim (US) Inc. d/b/a Lafarge Alpena at the Alpena Plant in Alpena, Michigan, on the Kiln 21 Breaching Duct on May 18 and 19, 2021. This report summarizes the results of the test program and test methods.

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

TEST INFORMATION		
Test Location	Test Dates	Test Parameter
Kiln 21 Breaching Duct	May 18 and 19, 2021	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.*"

TEST RESULTS					
Parameter	Date	Units	Relative Accuracy Acceptance Criteria	Emission Rate	Emission Limit
FPM	5/18/2021-5/19/21	lb/ton	USEPA Method 5, 40CFR60, Appendix A	0.061 lb/ton	0.07 lb/ton

The CPMS SSOL was determined to be 4.40 (based on mA recorded by CPMS during testing).

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	Mr. Travis Weide Area Environmental & Public Affairs Manager 989-358-3321 travis.weide@lafargeholcim.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Eric Ehlers Director, Field Operations 630-993-2100 (phone) eehlers@mp-mail.com
Testing Company Personnel		Mr. Jared Priesz Test Engineer
		Mr. Chris Buglio Test Technician

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 diagrams 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. 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:

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 AT KILN 21 BREACHING DUCT							
Stack Dimensions (Feet)	Stack Area (Square Feet)	No. of Ports	Port Length (Inches)	Upstream Diameters	Downstream Diameters	Test Parameter	Number of Sampling Points
8.00 x 8.75	70.00	3	9.0	~1	~8	FPM	27

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. A 9-foot-long S-type pitot tube, 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 F. Calibration data are presented in Appendix G. This testing met the performance specifications as outlined in the Method.

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

Stack gas O₂ and CO₂ concentrations were determined in accordance with USEPA Method 3A. An ECOM analyzer was used to determine the O₂ and CO₂ concentrations in the manner specified in the Method. The O₂ instrument operates in the nominal range of 0% to 21% with the specific range determined by the high-level calibration gas. The CO₂ 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. This testing met the performance specifications as outlined in the Method.

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Method 5 Filterable Particulate Matter (FPM) Determination

Stack gas filterable PM concentrations and emission rates were determined in accordance with Method 5. The probe and filter housing were maintained at a temperature of 248°F +/- 25°F. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate. Four impingers were utilized, the first two each containing 100ml of deionized water, the third was empty, and the fourth contained approximately 200 grams of silica gel. The impingers were weighed prior to and after each test run in order to determine moisture content of the stack gas. The total sample time was 67.5 minutes, with twenty-seven (27) sample points being utilized (9 points per port, 3 total ports). A minimum of 1 dscm was sampled for each run.

PM in the sample probe was recovered utilizing acetone; a minimum of three passes of the probe brush through the entire probe was performed, followed by a visual inspection of the acetone exiting the probe. If the acetone solution exiting the probe was clear, the wash was considered complete, if not, another pass of the brush through the probe was made and inspected until the solution was clear. The nozzle was then removed from the probe and cleaned in a similar manner, utilizing an appropriately sized nozzle brush. The probe wash and filter catch were analyzed by Mostardi Platt personnel. 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 21 Breaching Duct
Test Method: 5

	Normal	Normal	Normal	
Source Condition	Normal	Normal	Normal	
Date	5/18/21	5/18/21	5/19/21	
Start Time	7:50	9:35	15:55	
End Time	8:56	10:41	17:01	
	Run 1	Run 2	Run 4	Average
Stack Conditions				
Average Gas Temperature, °F	384.4	388.3	378.8	383.8
Flue Gas Moisture, percent by volume	5.0%	5.3%	5.4%	5.2%
Average Flue Pressure, in. Hg	29.60	29.52	29.53	29.55
Gas Sample Volume, dscf	48.284	47.961	45.747	47.331
Average Gas Velocity, ft/sec	36.912	37.003	35.042	36.319
Gas Volumetric Flow Rate, acfm	153,541	153,920	145,765	151,075
Gas Volumetric Flow Rate, dscfm	90,269	89,514	85,675	88,486
Gas Volumetric Flow Rate, scfm	94,980	94,515	90,544	93,346
Average %CO ₂ by volume, dry basis	17.1	16.1	17.9	17.0
Average %O ₂ by volume, dry basis	9.1	10.2	9.0	9.4
Isokinetic Variance	102.3	102.4	102.1	102.3
Clinker Production Rate, ton/hr	44.02	45.76	42.70	44.16
CPMS Response, mA	4.35	4.48	4.37	4.40
Filterable Particulate Matter (Method 5)				
grams collected	0.01160	0.00877	0.01221	0.01086
grains/acf	0.0022	0.0016	0.0024	0.0021
grains/dscf	0.0037	0.0028	0.0041	0.0035
lb/hr	2.868	2.165	3.024	2.686
lb/ton of clinker	0.065	0.047	0.071	0.061
Site Specific Operating Limit (SSOL) Determination				
Source Emissions Limit, lb/ton			0.07	
CPMS Zero, mA			4.00	
Filterable Particulate Matter, % of Emissions Limit			87.3%	
SSOL			4.40	

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



Eric L. Ehlers

Project Manager



Jeffrey M. Crivlare

Quality Assurance

APPENDICES

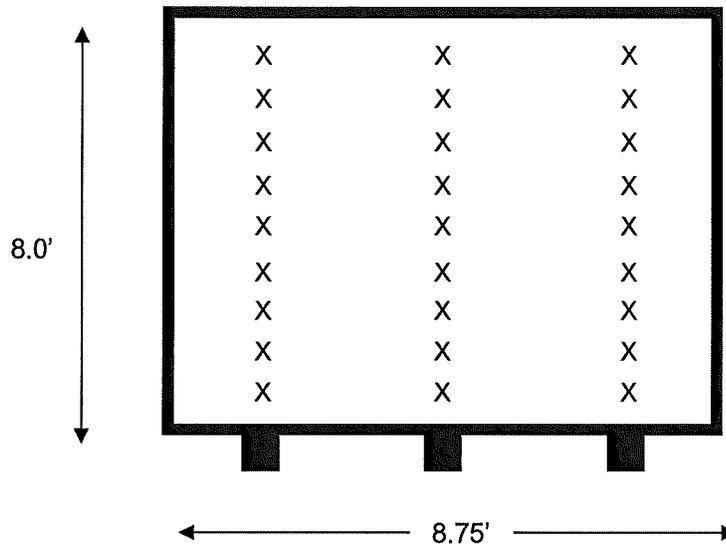
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Appendix A - Test Section Diagram

EQUAL AREA TRAVERSE FOR RECTANGULAR DUCTS



Job: Holcim (US) Inc.
Alpena Plant

Date: May 18 and 19, 2021

Area: 70.00 Square Feet

Test Location: Kiln 21 Breaching Duct

No. Test Ports: 3

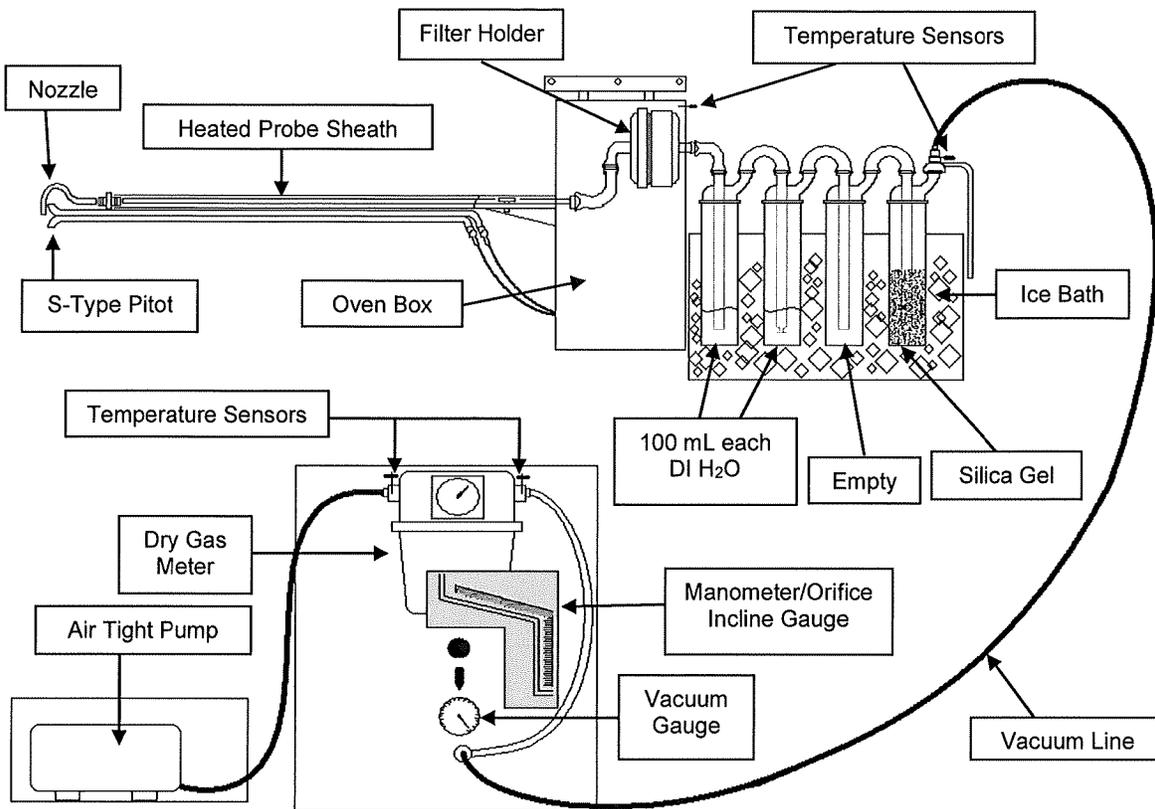
Length: 8.00 Feet

Tests Points per Port: 9

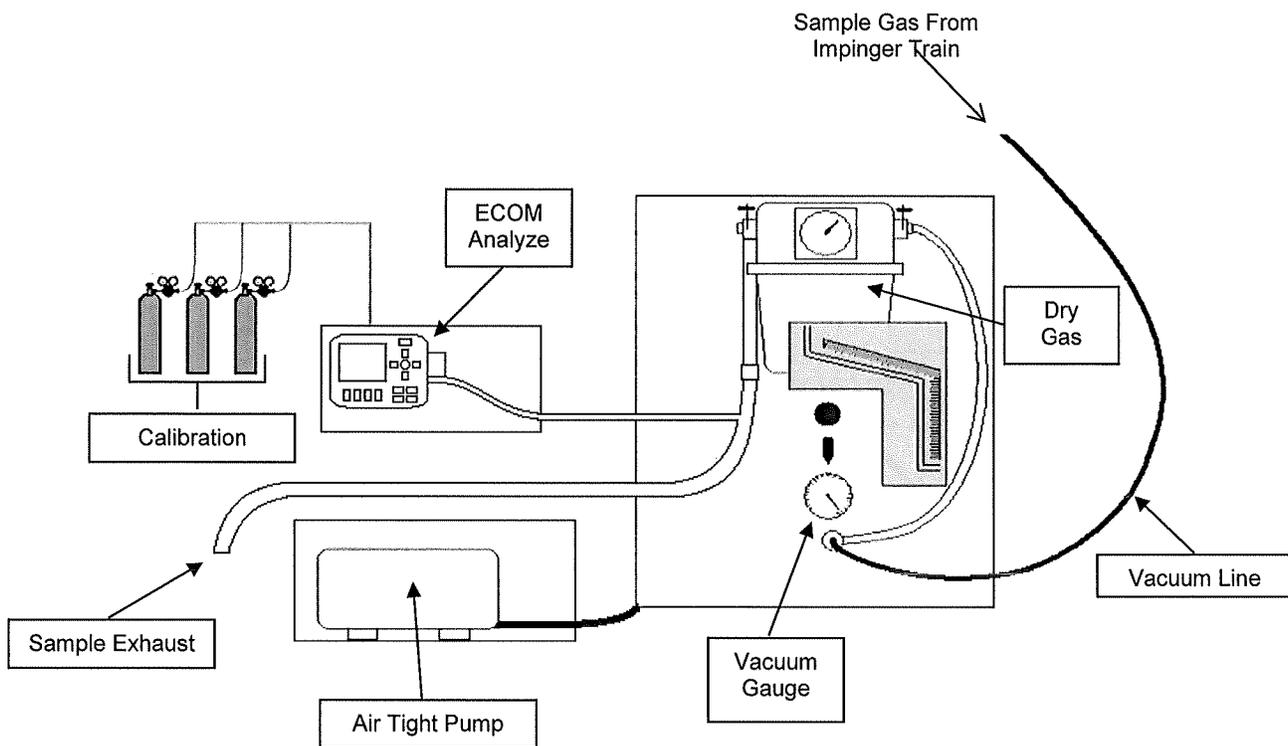
Width: 8.75 Feet

Appendix B - Sample Train Diagrams

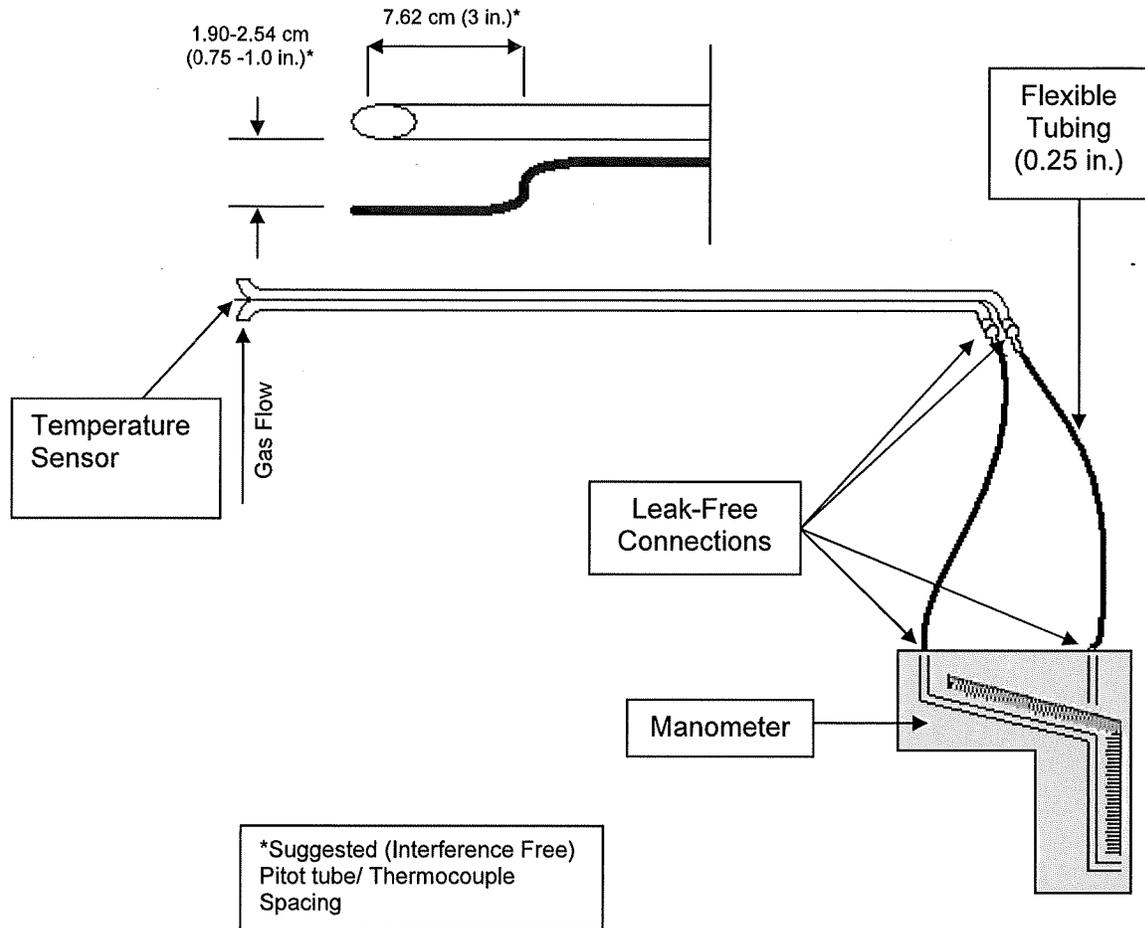
USEPA Method 5- Particulate Matter Sample Train Diagram



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



USEPA Method 2 – Type S Pitot Tube Manometer Assembly



Appendix C - Calculation Nomenclature and Formulas