

## 1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted compliance test programs on the filterable particulate matter continuous parameter monitoring system (CPMS) on the Wet Gas Scrubber 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
Wet Gas Scrubber (WGS) Stack	September 1, 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 each of the below listed sources meet their FPM (and <PM10, as applicable) emission limit and to establish a site-specific operating limit (SSOL) for the Wet Gas Scrubber CPMS.

Test Location	Parameter	Test Result	Emission Limit	CPMS SSOL
WGS Stack	FPM	0.040 lb/ton	0.07 lb/ton	5.01

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	Mallory Miller Area Environmental Engineer (224) 517-6896 mallory.miller@holcim.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Stuart Sands Senior Project Manager 630-993-2663 (phone) ssands@mp-mail.com

The test crew consisted of Messrs. A. Benninghoff, M. Neessen, and S. Sands.

## 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. 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:

### 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
WGS Stack	12 Feet	2	5	6.0	4.5	FPM	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 particulate 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 Oxygen (O<sub>2</sub>)/Carbon Dioxide (CO<sub>2</sub>) Determination

Flue gas O<sub>2</sub> and CO<sub>2</sub> concentrations for the Wet Gas Scrubber Stack were determined in accordance with USEPA Method 3A. An ECOM analyzer was used to determine the O<sub>2</sub> and CO<sub>2</sub> concentrations by connecting the analyzer to the exit of the dry gas meter. The O<sub>2</sub> instrument operates in the nominal range of 0% to 25% with the specific range determined by the high-level calibration gas. The CO<sub>2</sub> 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. Calibration data is provided in Appendix H. Copies of the gas cylinder certifications are found in Appendix I.

## 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 will be 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 are 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:** Wet Scrubber Stack  
**Test Method:** 5

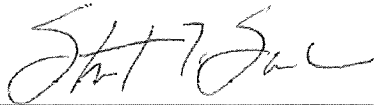
	Source Condition	Normal	Normal	Normal	
	Date	9/1/22	9/1/22	9/1/22	
	Start Time	10:58	14:26	16:30	
	End Time	12:02	15:29	17:33	
		Run 1	Run 2	Run 3	Average
<b>Stack Conditions</b>					
Average Gas Temperature, °F		117.2	116.0	117.7	117.0
Flue Gas Moisture, percent by volume		10.8%	10.5%	11.0%	10.8%
Average Flue Pressure, in. Hg		29.42	29.42	29.42	29.42
Gas Sample Volume, dscf		56.677	57.271	60.677	58.208
Average Gas Velocity, ft/sec		68.327	68.623	73.008	69.986
Gas Volumetric Flow Rate, acfm		463,658	465,666	495,422	474,915
Gas Volumetric Flow Rate, dscfm		372,008	375,662	396,287	381,319
Gas Volumetric Flow Rate, scfm		417,049	419,734	445,267	427,350
Average %CO <sub>2</sub> by volume, dry basis		12.3	13.5	13.1	13.0
Average %O <sub>2</sub> by volume, dry basis		11.0	11.4	10.9	11.1
Isokinetic Variance		99.6	99.7	100.1	99.8
Clinker Production Rate, ton/hr		134.92	129.63	134.90	133.15
CPMS Response, mA		4.81	4.79	4.73	4.77
<b>Filterable Particulate Matter (Method 5)</b>					
grams collected		0.01087	0.00377	0.00393	0.00619
grains/dscf		0.0030	0.0010	0.0010	0.0017
lb/hr		9.436	3.271	3.395	5.367
lb/1000 lb of stack gas		0.005	0.002	0.002	0.003
lb/ton of clinker		0.070	0.025	0.025	0.040
<b>Site Specific Operating Limit (SSOL) Determination</b>					
Source Emissions Limit, lb/ton				0.07	
CPMS Zero, mA				4.00	
Filterable Particulate Matter, % of Emissions Limit				57.3%	
SSOL				5.01	

## 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



Stuart Sands

Project Manager



Eric Ehlers

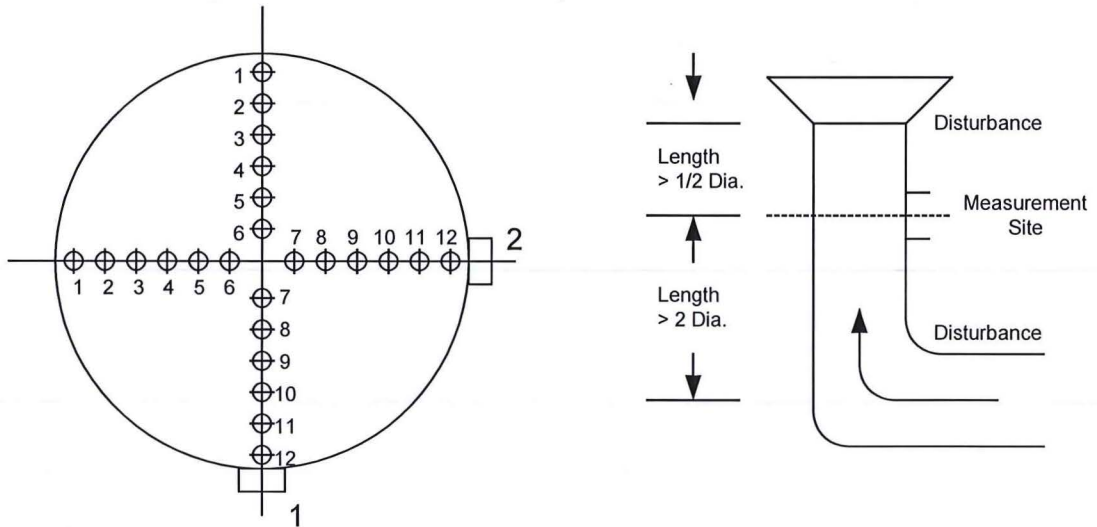
Quality Assurance

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# APPENDICES

## Appendix A - Test Section Diagrams

## EQUAL AREA TRAVERSE FOR ROUND DUCTS (Particulate Matter)



Job: Holcim (US) Inc.  
Alpena Cement Plant

Date: September 1, 2022

Test Location: Wet Gas Scrubber Stack

Duct Diameter: 12 Feet

Duct Area: 113.097 Square Feet

No. Points Across Diameter: 24

No. of Ports: 2

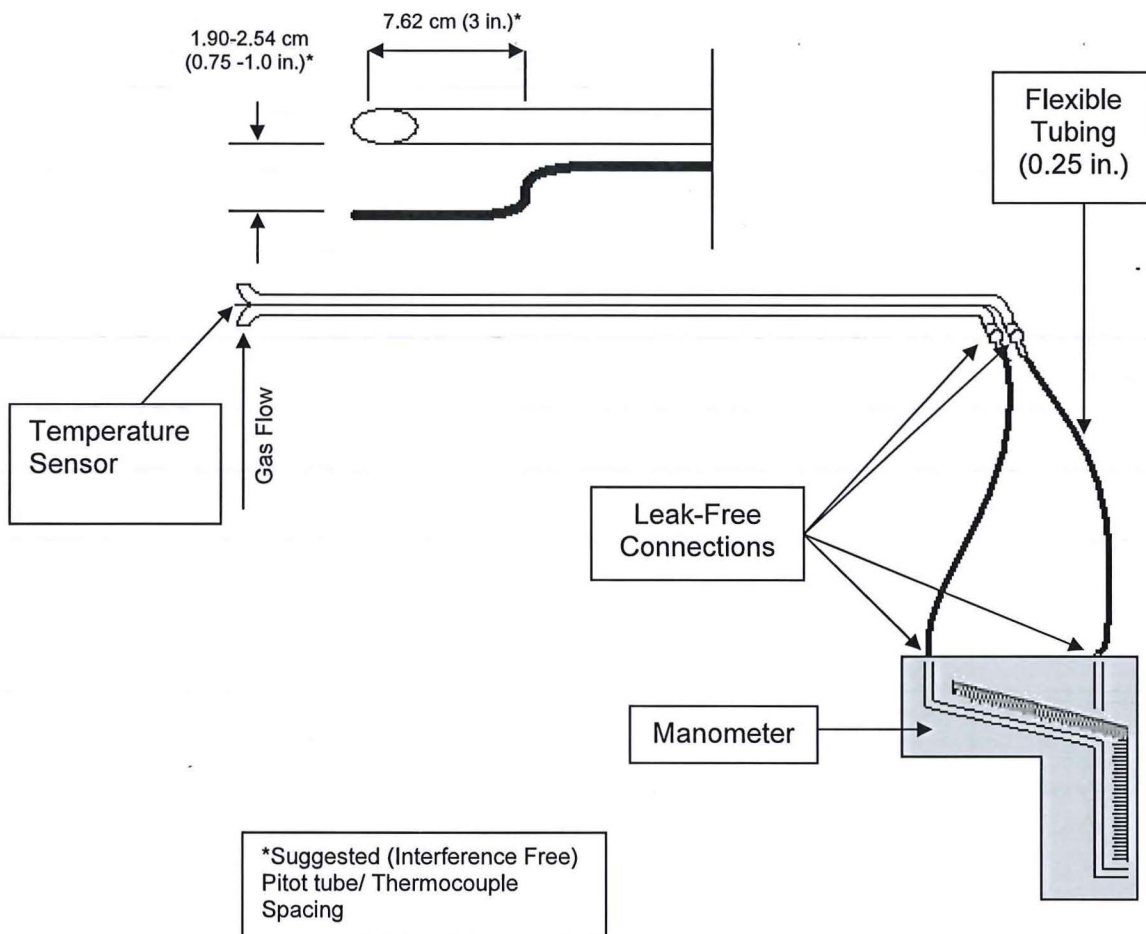
Port Length: 5 Inches



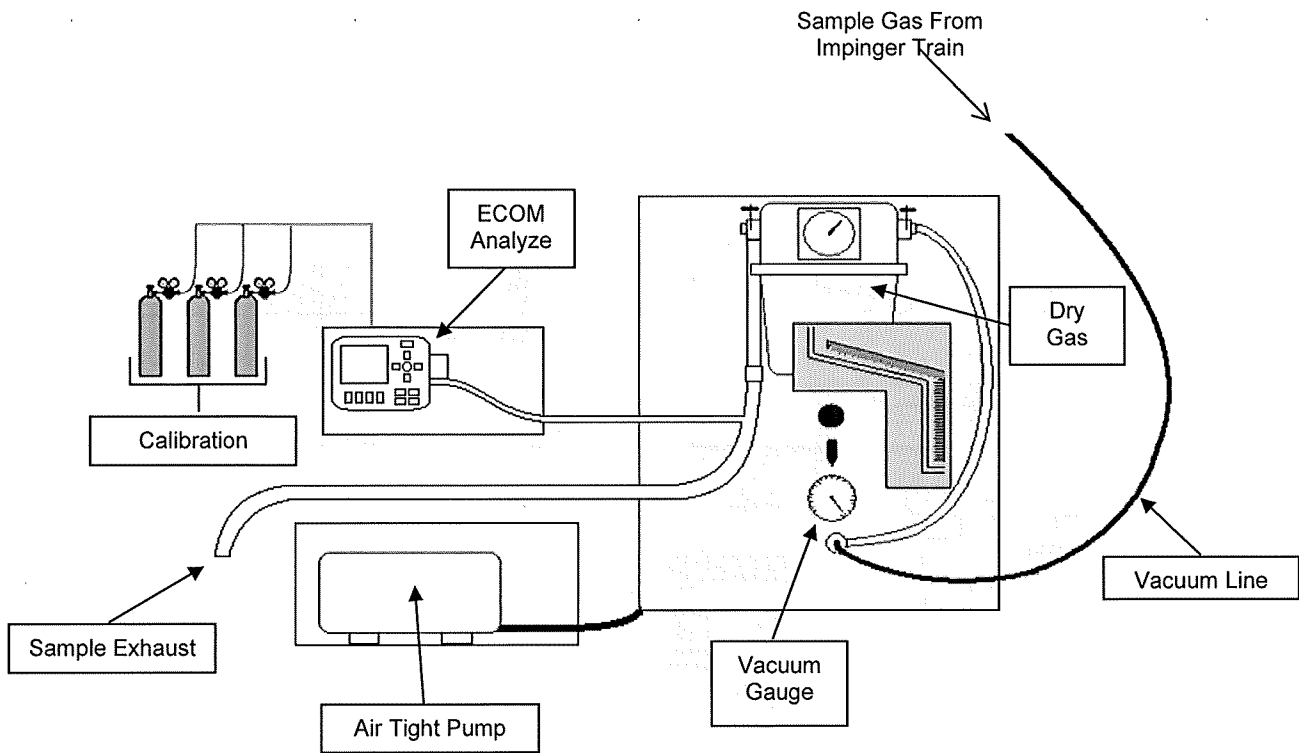
**Appendix B - Sample Train Diagrams**

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## 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

