1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a compliance test program for Holcim (US) d/b/a Lafarge Alpena at the Alpena Cement Plant in Alpena, Michigan, on the Kiln 21 Breaching Duct on August 24, 2021. This report summarizes the results of the test program and test methods.

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

TEST INFORMATION		
Test Location	**Test Date**	**Test Parameters**
Kiln 21 Breaching Duct	August 24, 2021	Dioxin/Furan (D/F)

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.*"

D/F Results Summary				
Test Location	**Test Date**	**Parameter**	**Emission Limit**	**Emission Rate**
Kiln 21 Breaching Duct	August 24, 2021	D/F	0.4 ng/dscm @ 7% O_2 Dry TEQ	≤ 0.0233 ng/dscm @ 7% O_2 Dry TEQ

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. Daniel J. Kossack Project Manager 630-993-2100 (phone) dkossack@mp-mail.com

The test crew consisted of Messrs. M. Friduss, C. Reice, D. Kossack.

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) d/b/a Lafarge Alpena 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**
Kiln 21 Breaching Duct	8' x 8.75'	3	4	0.47	1.11	D/F	27

Method 2 Volumetric Flow Rate Determination

Gas velocity was measured following USEPA Method 2, 40CFR60, Appendix A., for purposes of calculating the stack volumetric flow rate. An 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 E. Calibration data are presented in Appendix H. This testing met the performance specifications as outlined in the Method.

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

Stack gas O_2 and CO_2 concentrations were determined in accordance with USEPA Method 3A. An ECOM analyzer was used to determine the O_2 and CO_2 concentrations in the manner specified in the Method. 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. This testing met the performance specifications as outlined in the Method.

Method 23 Dioxin and Furan Determination

Stack gas dioxin and furan concentrations and emission rates were determined in accordance with Method 23, 40 CFR, Part 60, Appendix A. An Environmental Supply Company sampling train was used to sample for concentrations of dioxins and furans, in the manner specified in the Method.

After recovery, samples were analyzed by Enthalpy Analytical laboratory following the procedures specified in the Method. Laboratory analysis data are found in Appendix D. All of the equipment used was calibrated in accordance with the specifications of the Method. 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: 23

Source Condition	Normal	Normal	Normal	
Date	8/24/21	8/24/21	8/24/21	
Start Time	10:50	14:45	18:17	
End Time	14:03	17:58	21:29	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	409.3	413.5	412.5	411.8
Flue Gas Moisture, percent by volume	4.4%	5.9%	5.8%	5.4%
Average Flue Pressure, in. Hg	29.03	29.03	29.03	29.03
Gas Sample Volume, dscf	121.833	103.378	104.981	110.064
Average Gas Velocity, ft/sec	37.273	37.919	38.453	37.882
Gas Volumetric Flow Rate, acfm	156,547	159,262	161,504	159,104
Gas Volumetric Flow Rate, dscfm	88,227	87,945	89,331	88,501
Gas Volumetric Flow Rate, scfm	92,272	93,414	94,838	93,508
Average $\%CO_2$ by volume, dry basis	17.8	17.8	17.7	17.8
Average $\%O_2$ by volume, dry basis	9.5	9.5	9.4	9.5
Isokinetic Variance	101.5	102.6	102.6	102.2
Baghouse Inlet Temperature, °F	249	249	245	248
PCDD/PCDF Emissions				
ng/dscm	≤ 0.1500	≤ 0.3600	≤ 0.1300	≤ 0.2133
ng/dscm TEQ	≤ 0.0384	≤ 0.0095	≤ 0.0096	≤ 0.0192
ng/dscm @ 7% O_2 Dry TEQ	≤ 0.0468	≤ 0.0116	≤ 0.0116	≤ 0.0233

4.0 CERTIFICATION

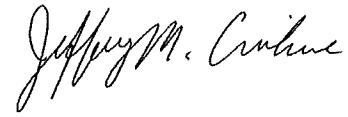
Mostardi Platt is pleased to have been of service to Holcim (US) d/b/a Lafarge Alpena If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

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

Daniel J. Kossack



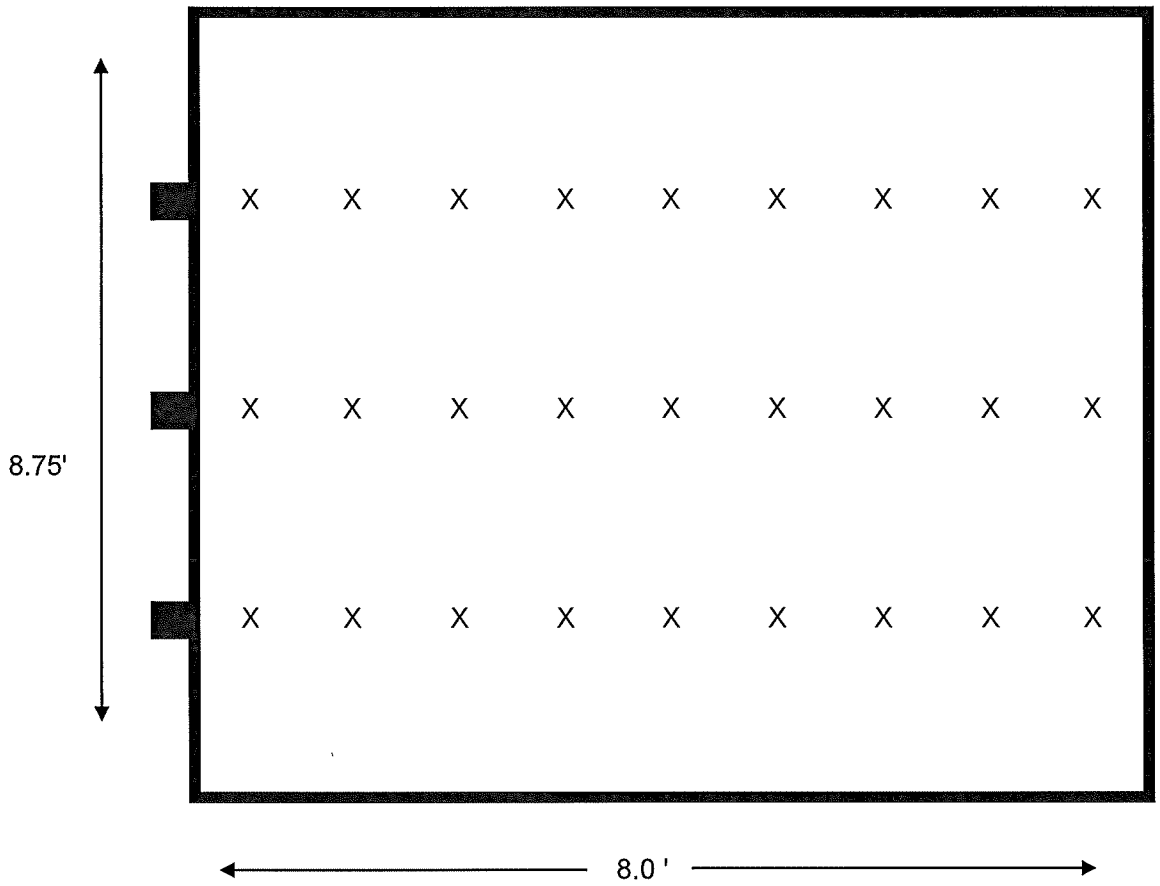
Quality Assurance

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: August 24, 2021

Test Location: Kiln 21 Breaching Duct

Length: 8.0 Feet

Width: 8.75 Feet

Upstream: 0.47 Diameters

Downstream: 1.11 Diameters

Equivalent Diameter: 8.358 Feet

Port Length: 4.0 Inches

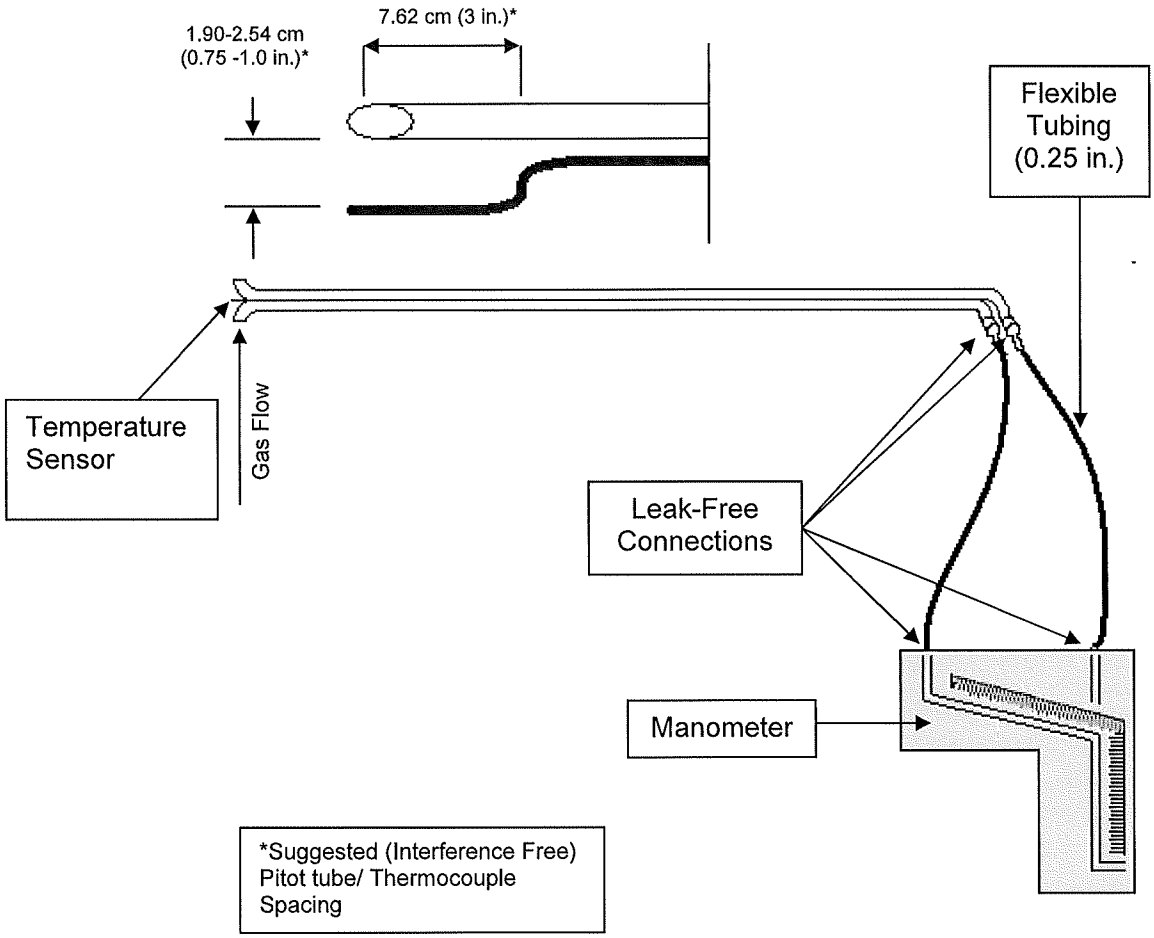
Area: 70 square feet

No. Test Ports: 3 Tests

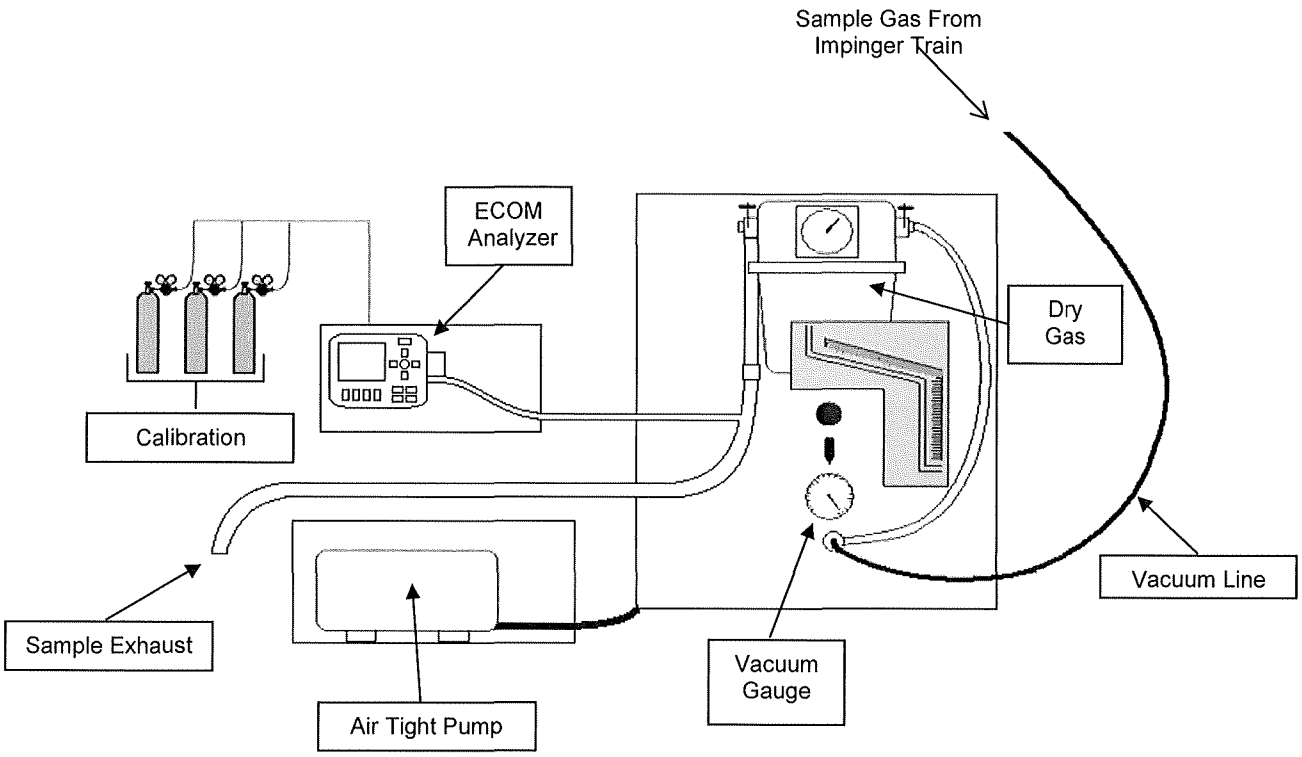
Points per Port: 9

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



Method 23 - Determination of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Municipal Waste Combustors