

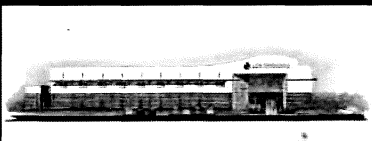


AIR HYGIENE, INC.

Testing Solutions for a Better World

EMISSION COMPLIANCE TEST
FOR
RAW MILLS 14 AND 15
PREPARED FOR
HOLCIM (US) INC. D/B/A LAFARGE, SRN B1477
AT THE
ALPENA PLANT
ALPENA, MICHIGAN
SEPTEMBER 17-18, 2019

Permit No: MI-ROP-B1477-2012



Corporate Headquarters
1600 W Tacoma Street
Broken Arrow, Oklahoma 74012



AIR HYGIENE, INC.

(918) 307-8865 or (888) 461-8778
www.airhygiene.com

Remote Testing Offices

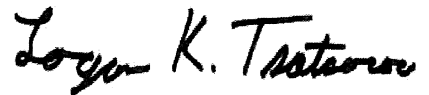
Las Vegas, NV 89156
Ft. Worth, TX 76028
Humble, TX 77338
Shreveport, LA 71115
Miami, FL 33101
Pittsburgh, PA 15205

**EMISSION COMPLIANCE TEST
FOR
RAW MILLS 14 AND 15 CEMS
PREPARED FOR
HOLCIM (US) INC. D/B/A LAFARGE, SRN B1477
AT THE
ALPENA PLANT
ALPENA, MICHIGAN
SEPTEMBER 17-18, 2019**

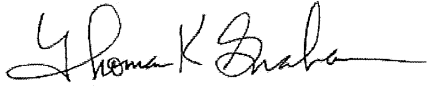
Prepared and Reviewed by:



Matt McBride, QSTI
Sr. Project Manager



Logan Tsotsoros
AHU Support Staff



Thomas K. Graham, PE, QSTI
Director of Education



I, Cole McBride, QSTI
Sr. Project Manager

certify that this testing was conducted and
this report was created in conformance
with the requirements of ASTM D7036

(this page intentionally left blank)

Table of Contents

1.0	INTRODUCTION	1
1.1	TEST PURPOSE AND OBJECTIVES	1
1.2	SUMMARY OF TEST PROGRAM	1
1.2.1	Participating Organizations	1
1.2.2	Industry	1
1.2.3	Air Permit Requirements	1
1.2.4	Plant Location	1
1.2.5	Equipment Tested	1
1.2.6	Emission Points	1
1.2.7	Emission Parameters Measured	1
1.2.8	Dates of Emission Test	2
1.2.9	Federal Certifications	2
1.3	KEY PERSONNEL	2
2.0	SUMMARY OF TEST RESULTS	2
3.0	SOURCE OPERATION	3
3.1	PROCESS DESCRIPTION	3
3.2	SAMPLING LOCATION	3
4.0	SAMPLING AND ANALYTICAL PROCEDURES	4
4.1	TEST METHODS	4
4.2	INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS	4

APPENDICES

Appendix A	Test Results and Calculations
Appendix B	Emission Data Records
Appendix C	Calibration Gas Certifications
Appendix D	Quality Assurance and Quality Control Data
Appendix E	Equipment Calibration Records

**Emissions Compliance Test
Raw Mills 14 and 15
Holcim (US) Inc. d/b/a Lafarge, SRN B1477
Alpena Plant
Alpena, Michigan
September 17-18, 2019**

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the Emissions Compliance Test for particulate matter (PM) from the exhaust of Raw Mills 14 and 15 for Holcim (US) Inc. d/b/a Lafarge, SRN B1477 at the Alpena Plant in Alpena, Michigan. This report details the background, results, process description, and the sampling/analysis methodology of the stack sampling survey conducted on September 17-18, 2019.

1.1 TEST PURPOSE AND OBJECTIVES

The purpose of the test was to conduct a periodic compliance emission test to document levels of selected pollutants. The information will be used to confirm compliance with the operating permit issued by the Michigan Department of Environmental Quality (MDEQ). The specific objective was to determine the emission concentration of PM from the exhaust of Holcim (US) Inc. d/b/a Lafarge, SRN B1477's Raw Mills 14 and 15.

1.2 SUMMARY OF TEST PROGRAM

The following list details pertinent information related to this specific project:

- 1.2.1 Participating Organizations
 - Michigan Department of Environmental Quality (MDEQ)
 - Holcim (US) Inc. d/b/a Lafarge, SRN B1477
 - Air Hygiene
- 1.2.2 Industry
 - Cement
- 1.2.3 Air Permit Requirements
 - Permit Number: MI-ROP-B1477-2012
- 1.2.4 Plant Location
 - Alpena Plant in Alpena, Michigan
 - GPS Coordinates [Latitude 45.07095, Longitude -83.41489]
 - 1435 Ford Avenue, Alpena, Michigan 49707
 - Federal Registry System / Facility Registry Service (FRS) No. – 110015742605
 - Source Classification Codes (SCC) – 30501120, 30500699, and 30500613
- 1.2.5 Equipment Tested
 - Raw Mills 14 and 15
- 1.2.6 Emission Points
 - Exhaust from Raw Mills 14 and 15
 - For all PM testing, 24 sample points in the exhaust stack from the Raw Mills 14 and 15
- 1.2.7 Emission Parameters Measured
 - PM
 - Flow
 - H₂O

- CO₂
 - O₂
- 1.2.8 Dates of Emission Test
- September 17-18, 2019
- 1.2.9 Federal Certifications
- Stack Testing Accreditation Council AETB Certificate No. 3796.02
 - International Standard ISO/IEC 17025:2005 Certificate No. 3796.01

1.3 KEY PERSONNEL

Holcim (US) Inc. d/b/a Lafarge, SRN B1477:	Travis Weide (travis.weide@lafargeholcim.com)	989-358-3321
MDEQ:	Jeremy Howe	231-878-6687
Air Hygiene:	Cole McBride (cmcbride@airhygiene.com)	918-307-8865
Air Hygiene:	Matt McBride (mmcbride@airhygiene.com)	918-307-8865
Air Hygiene:	Chandler King	918-307-8865
Air Hygiene:	Gharabet Torossian	918-307-8865
Air Hygiene:	Isaac Hernandez	918-307-8865
Air Hygiene:	Miguel Jimenez Martinez	918-307-8865
Air Hygiene:	Dana Albert	918-307-8865
Air Hygiene:	Ken Nuessmeier	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Holcim (US) Inc. d/b/a Lafarge, SRN B1477's Raw Mills 14 and 15 located at the Alpena Plant on September 17-18, 2019 are summarized in the following tables and relate only to the items tested.

The results of all measured pollutant emissions were below the required limits. All testing was performed without any real or apparent errors. All testing was conducted according to the approved testing protocol.

**TABLE 2.1
RAW MILL 14 PM EMISSIONS DATA SUMMARY**

Emission Rate Data	RM14-PM-1	RM14-PM-2	RM14-PM-3	Average	Units	Limits
Filterable PM Mass	3.59	4.01	3.05	3.55	mg	--
Filterable PM Concentration	4.02E-05	4.29E-05	3.32E-05	3.87E-05	g/dscf	--
	6.20E-04	6.61E-04	5.12E-04	5.98E-04	gr/dscf	--
Filterable PM Emission Rate	0.13	0.15	0.11	0.13	kg/hr	--
	0.29	0.32	0.24	0.28	lb/hr	27.51
	1.26	1.41	1.07	1.25	tpy	120.20
	0.0012	0.0013	0.0010	0.0011	lb/1000 lbs exhaust	0.03

TABLE 2.2
RAW MILL 15 PM EMISSIONS DATA SUMMARY

Emission Rate Data	RM15-PM-1	RM15-PM-2	RM15-PM-3	Average	Units	Limits
Filterable PM Mass	13.87	16.31	9.68	13.29	mg	--
Filterable PM Concentration	1.74E-04	2.09E-04	1.23E-04	1.69E-04	g/dscf	--
	2.69E-03	3.22E-03	1.90E-03	2.60E-03	gr/dscf	--
Filterable PM Emission Rate	0.45	0.52	0.31	0.43	kg/hr	--
	0.99	1.15	0.69	0.94	lb/hr	27.51
	4.33	5.04	3.03	4.13	tpy	120.20
	0.0051	0.0061	0.0036	0.0049	lb/1000 lbs exhaust	0.03

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

The Alpena Plant is located in Alpena, Michigan. The Raw Mill System mixes and grinds the raw materials (limestone, sand, bauxite, Bell shale, gypsum) and alternate raw materials (slag, iron ore, fly ash, and CKD) then sends the materials to the kilns.

Holcim (US) Inc. d/b/a Lafarge, SRN B1477 operates five rotary kilns, which manufacture Portland cement clinker using the dry process. A mixture of pulverized bituminous coal and petroleum coke, with a heating value of approximately 11,750 Btu per pound, serves as the primary fuel fed to the kilns. Coal and coke are fed to a Raymond bowl mill and ground to a fineness of approximately 95% passing a 200-mesh sieve.

EU RAW MILL 14 (Raw Mill 14), and EU RAW MILL 15 (Raw Mill 15), further grind the raw and alternate raw materials using ball mills. The raw mix powder is then sent to one of four storage silos before the materials are sent to the kilns via air slides, screw elevators and pumps. Two storage silos are associated with Kilns 19, 20, 21, and two storage silos are associated with Kilns 22, 23.

3.2 SAMPLING LOCATION

The Raw Mill 14 stack is circular measuring 63 inches in diameter at the test ports which are 126 inches upstream from the nearest disturbance and 252 inches downstream from the nearest disturbance. The Raw Mill 15 stack is 65.5 inches in diameter at the test ports which are 131 inches upstream from the nearest disturbance and 262 inches downstream from the nearest disturbance. For PM testing, an initial velocity traverse was performed across the stack from 24 total points in each stack. All PM sampling occurred from the same 24 points by leaving the probe at each for an equal amount of time at various velocities in order to draw isokinetically through the sample train.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

The emission test on Raw Mills 14 and 15 at the Alpena Plant was performed following United States Environmental Protection Agency (EPA) methods described by the Code of Federal Regulations (CFR). Table 4.1 outlines the specific methods performed on September 17-18, 2019.

**TABLE 4.1
SUMMARY OF SAMPLING METHODS**

Pollutant or Parameter	Sampling Method	Analysis Method
Sample Point Location	EPA Method 1	Equal Area Method
Stack Flow Rate	EPA Method 2	S-Type Pitot Tube
Oxygen	EPA Method 3A	Paramagnetic Cell
Carbon Dioxide	EPA Method 3A	Nondispersive Infrared Analyzer
Stack Moisture Content	EPA Method 4	Gravimetric Analysis
Particulate Matter	EPA Method 5	Front Half Filterables

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 2, 3A, 4, and 5.

Figure 4.1 depicts the sample system used for the real-time gas analyzer tests. The gas sample was continuously pulled through the probe and transported, via heat-traced Teflon® tubing, to a stainless-steel minimum-contact condenser designed to dry the sample. Transportation of the sample, through Teflon® tubing, continued into the sample manifold within the mobile laboratory via a stainless steel/Teflon® diaphragm pump. From the manifold, the sample was partitioned to the real-time analyzers through rotameters that controlled the flow rate of the sample. Exhaust samples were routed to the wet based analyzer prior to gas conditioning.

Figure 4.1 shows that the sample system was also equipped with a separate path through which a calibration gas could be delivered to the probe and back through the entire sampling system. This allowed for convenient performance of system bias checks as required by the testing methods.

All instruments were housed in a climate controlled, trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with the concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e. NOx calibration gases).

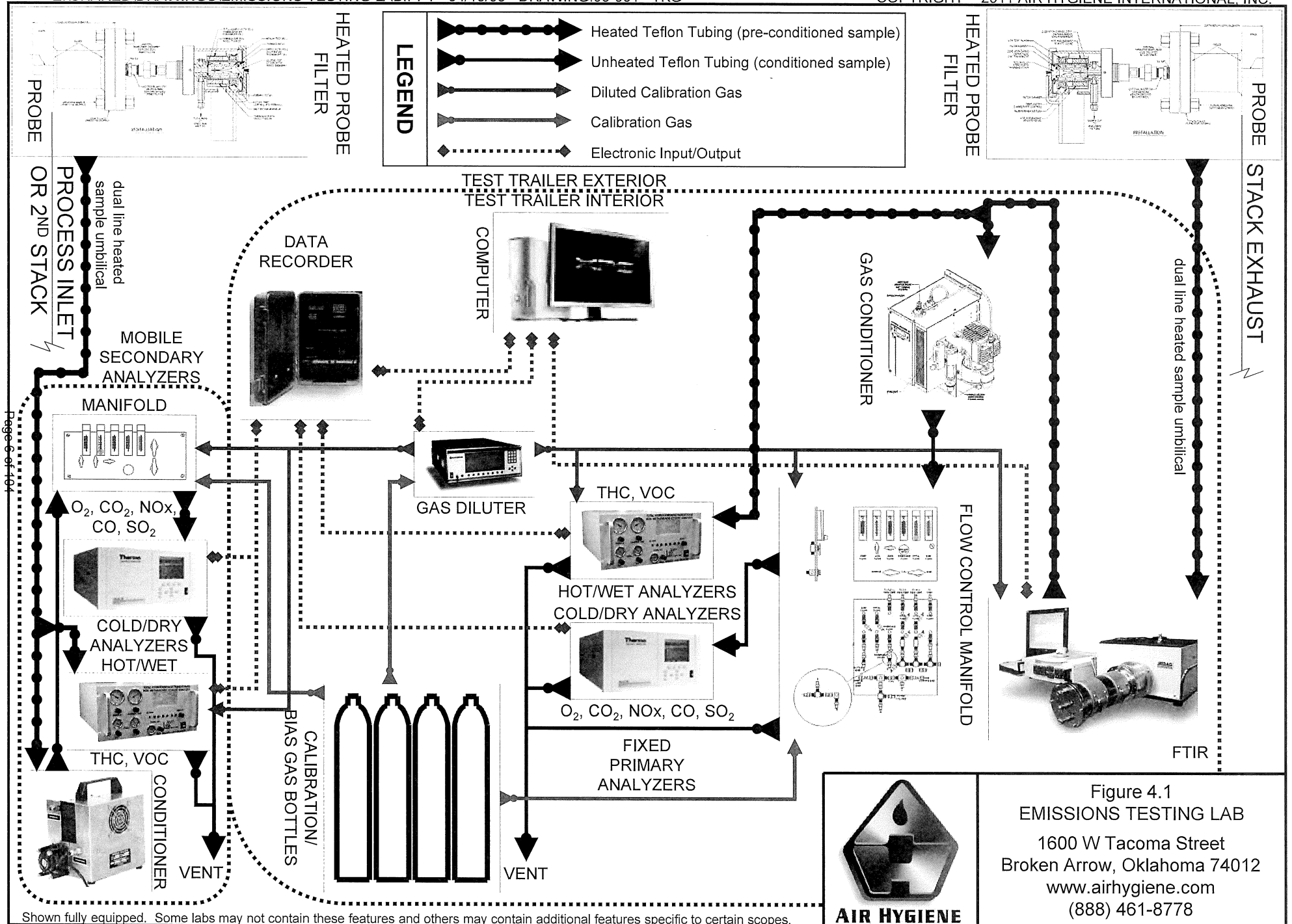
Table 4.2 provides a description of the analyzers used for the instrument portion of the tests. All data from the continuous monitoring instruments were recorded on a Logic Beach Portable Data Logging System which retrieves calibrated electronic data from each instrument every one second and reports an average of the collected data every 30 seconds.

Figure 4.2 represents the sample system used for the PM tests. A heated stainless-steel probe with a glass liner and nozzle was inserted into the sample ports of the stack to extract gas measurements from the emission stream through a filter and glass impinger train. Flow rates are monitored with oil filled manometers and total sample volumes are measured with a dry gas meter.

The stack gas analysis for O₂ and CO₂ concentrations was performed in accordance with procedures set forth in EPA Method 3A. The O₂ analyzer uses a paramagnetic cell detector and the CO₂ analyzer uses a continuous nondispersive infrared analyzer.

TABLE 4.2
ANALYTICAL INSTRUMENTATION

Parameter	Manufacturer and Model	Range	Sensitivity	Detection Principle
CO ₂	SERVOMEX 1440	0-20%	0.1%	Nondispersive infrared
O ₂	SERVOMEX 1440	0-25%	0.1%	Paramagnetic cell, inherently linear.

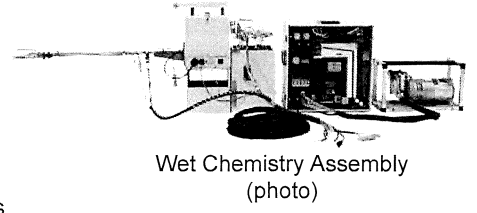
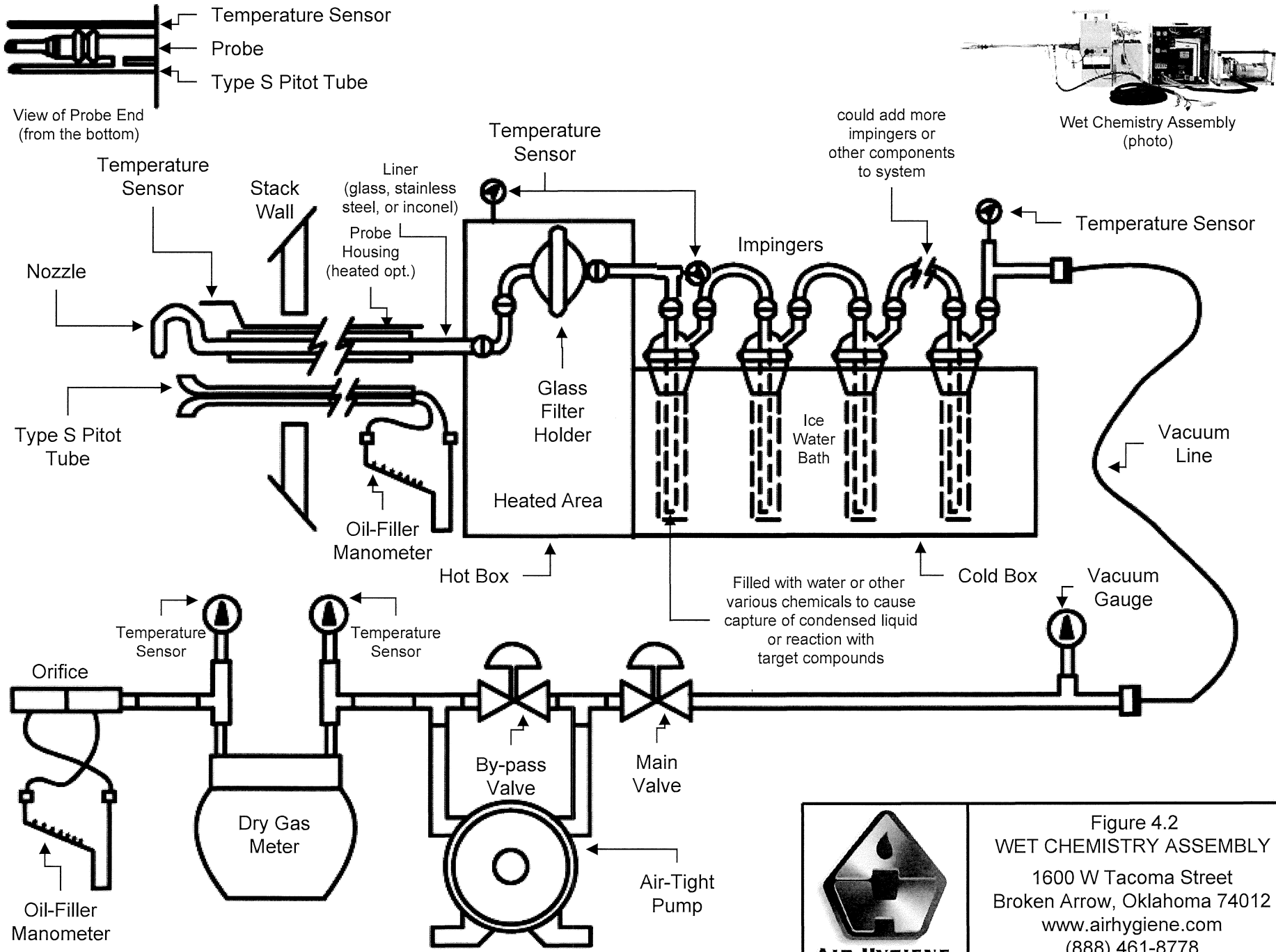


Page 6 of 101

Shown fully equipped. Some labs may not contain these features and others may contain additional features specific to certain scopes.



Figure 4.1
 EMISSIONS TESTING LAB
 1600 W Tacoma Street
 Broken Arrow, Oklahoma 74012
 www.airhygiene.com
 (888) 461-8778



Page 7 of 104



Figure 4.2
WET CHEMISTRY ASSEMBLY
 1600 W Tacoma Street
 Broken Arrow, Oklahoma 74012
www.airhygiene.com
 (888) 461-8778